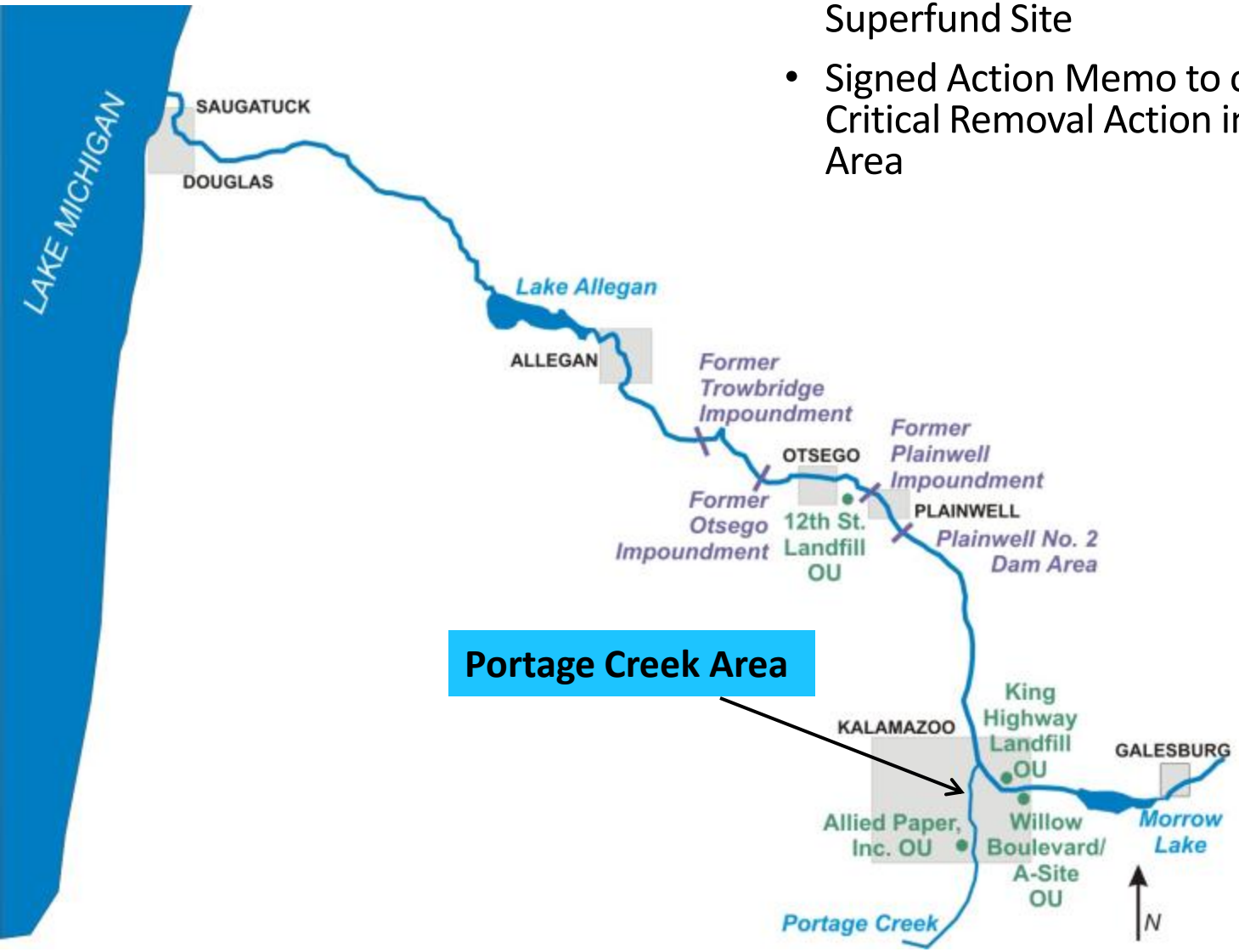
Portage Creek Area Removal Action

City of Kalamazoo, MI

August 3, 2011

Overview

- Portage Creek Area is part of the Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund Site
- Signed Action Memo to complete a Time-Critical Removal Action in the Portage Creek Area



Portage Creek Investigation Results

- Remedial Investigation/Feasibility Study (RI/FS) (1993-2000)
  - Highest PCB concentration 79 mg/kg
- Supplemental RI/FS (2009)
  - Highest PCB concentration 300 mg/kg
- November 2010 MDNRE sampling
  - Highest creek sediment PCB concentration 590 mg/kg
  - Highest floodplain PCB concentration 72 mg/kg

Portage Creek Excavation Areas Map

04/01/2011

FIELDS
Field Environmental Decision Support

0 750 1,500 3,000 Feet

Projection: UTM Zone 16N
Datum: NAD 83

N
W E
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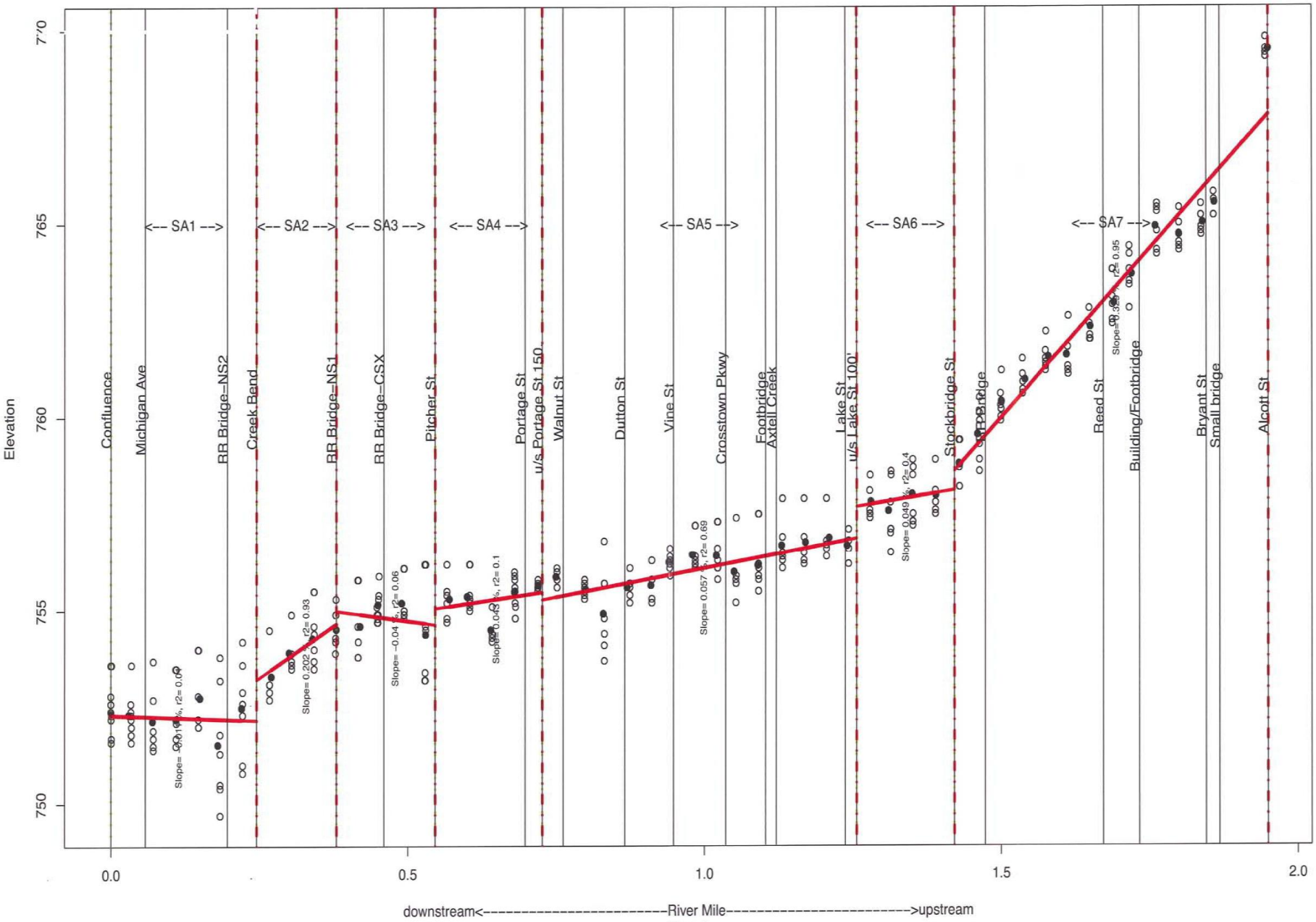
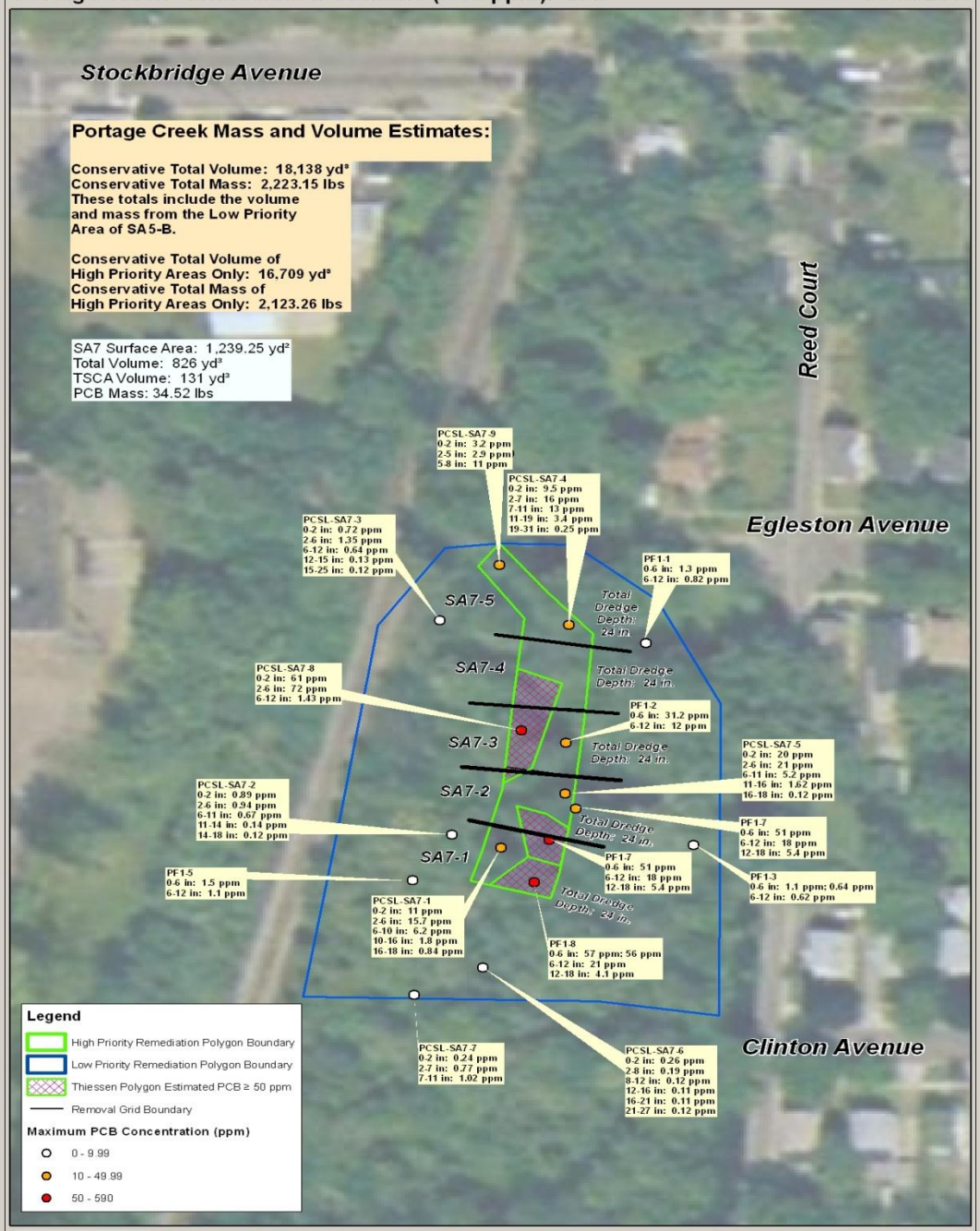
Cleanup Standard/Goal

- Remove approximately 17,000 cubic yards
- In-stream Sediment Performance Standard of 10 mg/kg
- In-stream Sediment Performance Standard Goal of 1 mg/kg with six inch over-dredge
- Floodplain Soil Performance Standard of 10 mg/kg
- Floodplain Soil Performance Standard Goal of 5mg/kg with six inch over-dredge
- Dredge depths range from 12 inches to approximately 56 inches in various Slope Areas

Figure 1

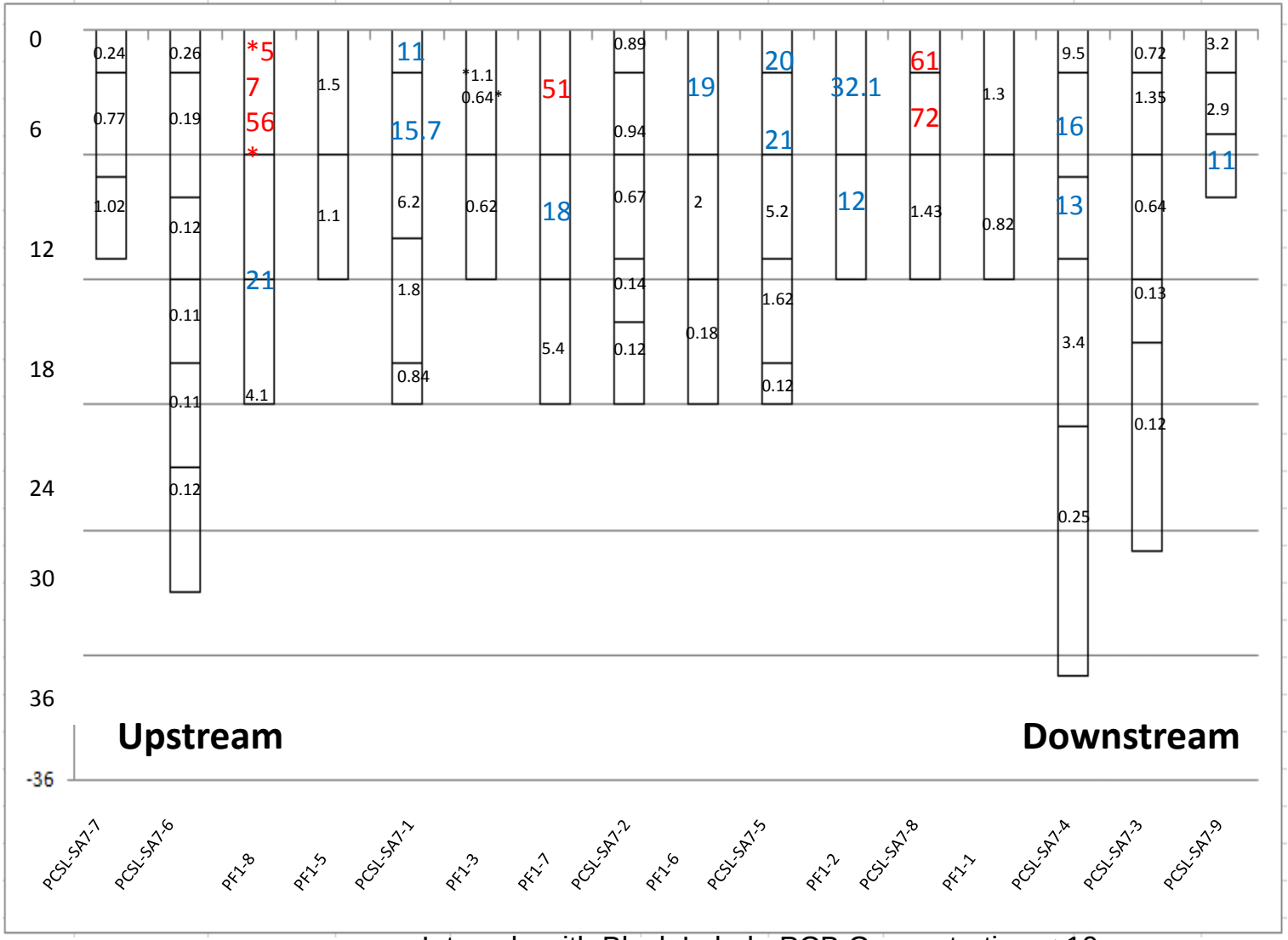
Portage Creek Sediment Elevations – Based on Probe Elevations adjust Portage St and Lake St boundaries u/s




Portage Creek - Remediation Scenario (> 10 ppm): SA7
04/14/2011
Stockbridge Avenue
Portage Creek Mass and Volume Estimates:
Conservative Total Volume: 18,138 yd³
Conservative Total Mass: 2,223.15 lbs
These totals include the volume and mass from the Low Priority Area of SA5-B.
Conservative Total Volume of High Priority Areas Only: 16,709 yd³
Conservative Total Mass of High Priority Areas Only: 2,123.26 lbs
SA7 Surface Area: 1,239.25 yd²
Total Volume: 826 yd³
TSCA Volume: 131 yd³
PCB Mass: 34.52 lbs
Reed Court
Egleston Avenue
Clinton Avenue
SA7-5
SA7-4
SA7-3
SA7-2
SA7-1
Total Dredge Depth: 24 in.
PCSL-SA7-9
0-2 in: 3.2 ppm
2-5 in: 2.9 ppm
5-8 in: 11 ppm
PCSL-SA7-4
0-2 in: 9.5 ppm
2-7 in: 16 ppm
7-11 in: 13 ppm
11-19 in: 3.4 ppm
19-31 in: 0.25 ppm
PCSL-SA7-3
0-2 in: 0.72 ppm
2-6 in: 1.35 ppm
6-12 in: 0.64 ppm
12-15 in: 0.13 ppm
15-25 in: 0.12 ppm
PF1-1
0-6 in: 1.3 ppm
6-12 in: 0.82 ppm
PCSL-SA7-8
0-2 in: 61 ppm
2-6 in: 72 ppm
6-12 in: 1.43 ppm
PF1-2
0-6 in: 31.2 ppm
6-12 in: 12 ppm
PCSL-SA7-5
0-2 in: 20 ppm
2-6 in: 21 ppm
6-11 in: 5.2 ppm
11-16 in: 1.62 ppm
16-18 in: 0.12 ppm
PCSL-SA7-2
0-2 in: 0.89 ppm
2-6 in: 0.94 ppm
6-11 in: 0.67 ppm
11-14 in: 0.14 ppm
14-18 in: 0.12 ppm
PF1-7
0-6 in: 51 ppm
6-12 in: 18 ppm
12-18 in: 5.4 ppm
PF1-5
0-6 in: 1.5 ppm
6-12 in: 1.1 ppm
PF1-7
0-6 in: 51 ppm
6-12 in: 18 ppm
12-18 in: 5.4 ppm
PF1-3
0-6 in: 1.1 ppm; 0.64 ppm
6-12 in: 0.62 ppm
PCSL-SA7-1
0-2 in: 11 ppm
2-6 in: 15.7 ppm
6-10 in: 6.2 ppm
10-16 in: 1.8 ppm
16-18 in: 0.84 ppm
PF1-8
0-6 in: 57 ppm; 56 ppm
6-12 in: 21 ppm
12-18 in: 4.1 ppm
PCSL-SA7-7
0-2 in: 0.24 ppm
2-7 in: 0.77 ppm
7-11 in: 1.02 ppm
PCSL-SA7-6
0-2 in: 0.26 ppm
2-8 in: 0.19 ppm
8-12 in: 0.12 ppm
12-16 in: 0.11 ppm
16-21 in: 0.11 ppm
21-27 in: 0.12 ppm
Legend
High Priority Remediation Polygon Boundary
Low Priority Remediation Polygon Boundary
Thiessen Polygon Estimated PCB ≥ 50 ppm
Removal Grid Boundary
Maximum PCB Concentration (ppm)
0 - 9.99
10 - 49.99
50 - 590
FIELDS
0
62.5
125
250
Feet
Projection: UTM Zone 16N
Datum: NAD 83

Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon SA7 (MDNRE SA7)

(Data summary from 1993, 1995, 2008 & 2010 data sets.)

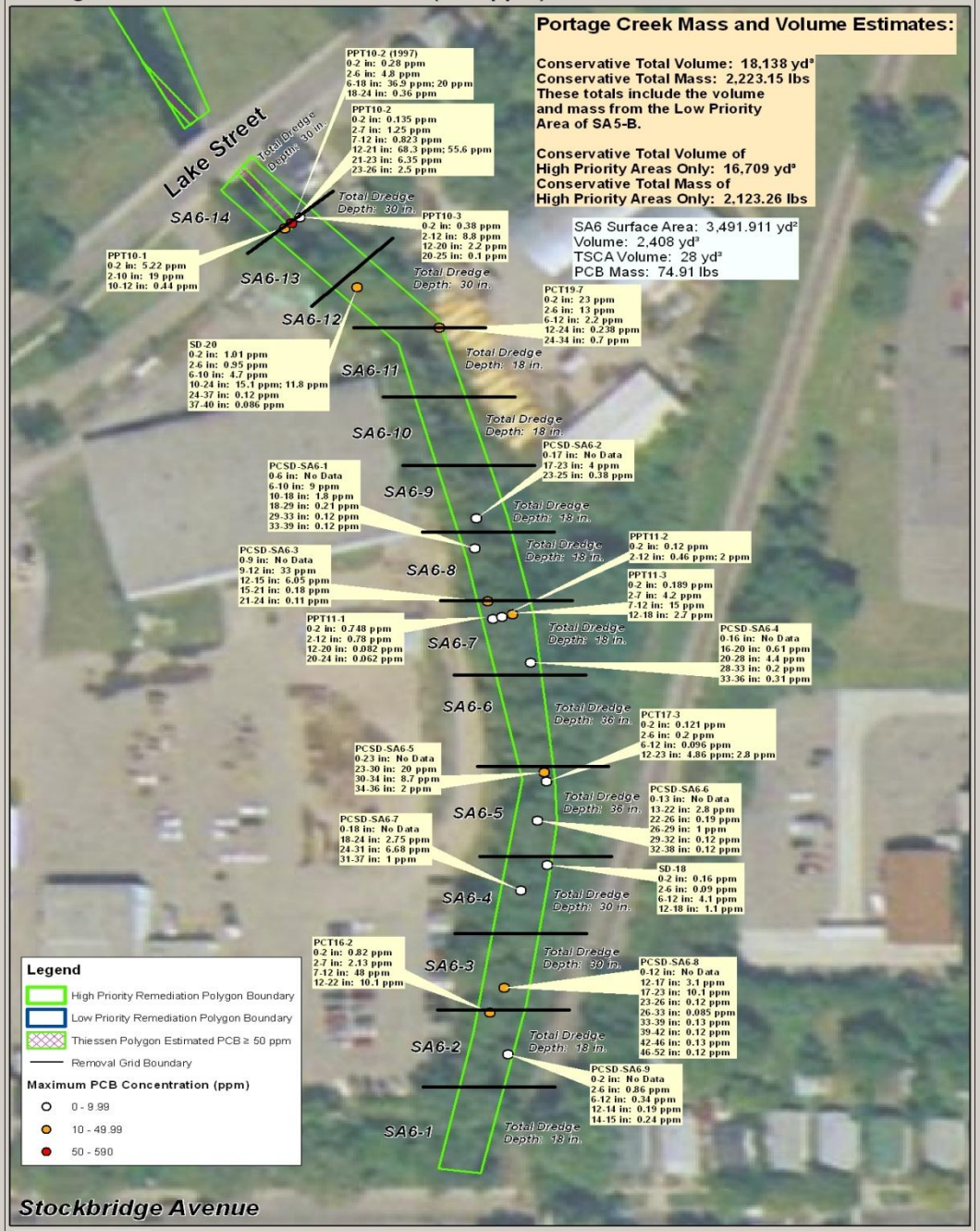


*NOTE: PF1-8 and PF1-3 contained two samples at the same depth; both concentration values are included on the graph.

Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data

Portage Creek - Remediation Scenario (> 10 ppm): SA6

04/14/2011



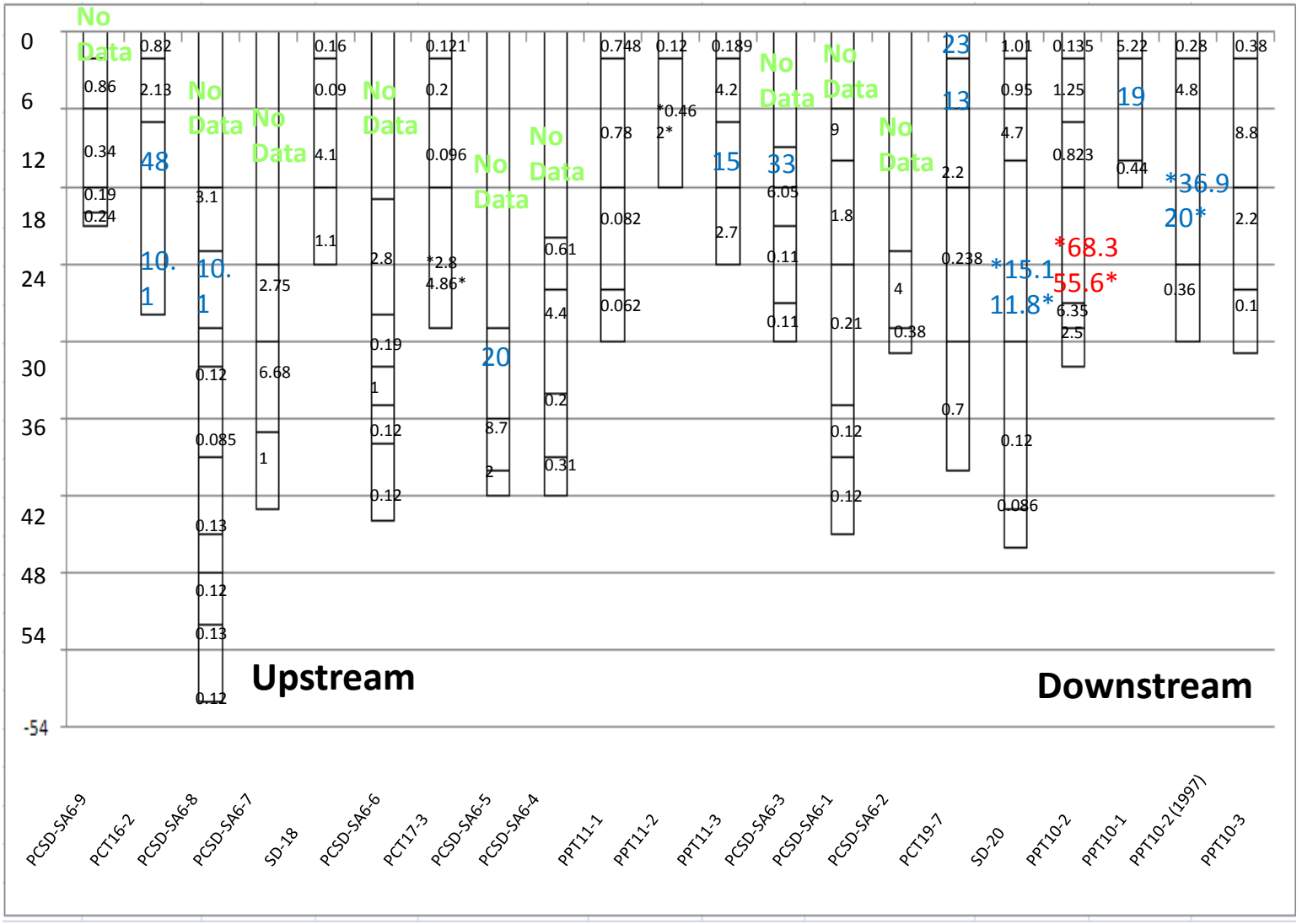
FIELDS

0 62.5 125 250 Feet

Projection: UTM Zone 16N
Datum: NAD 83

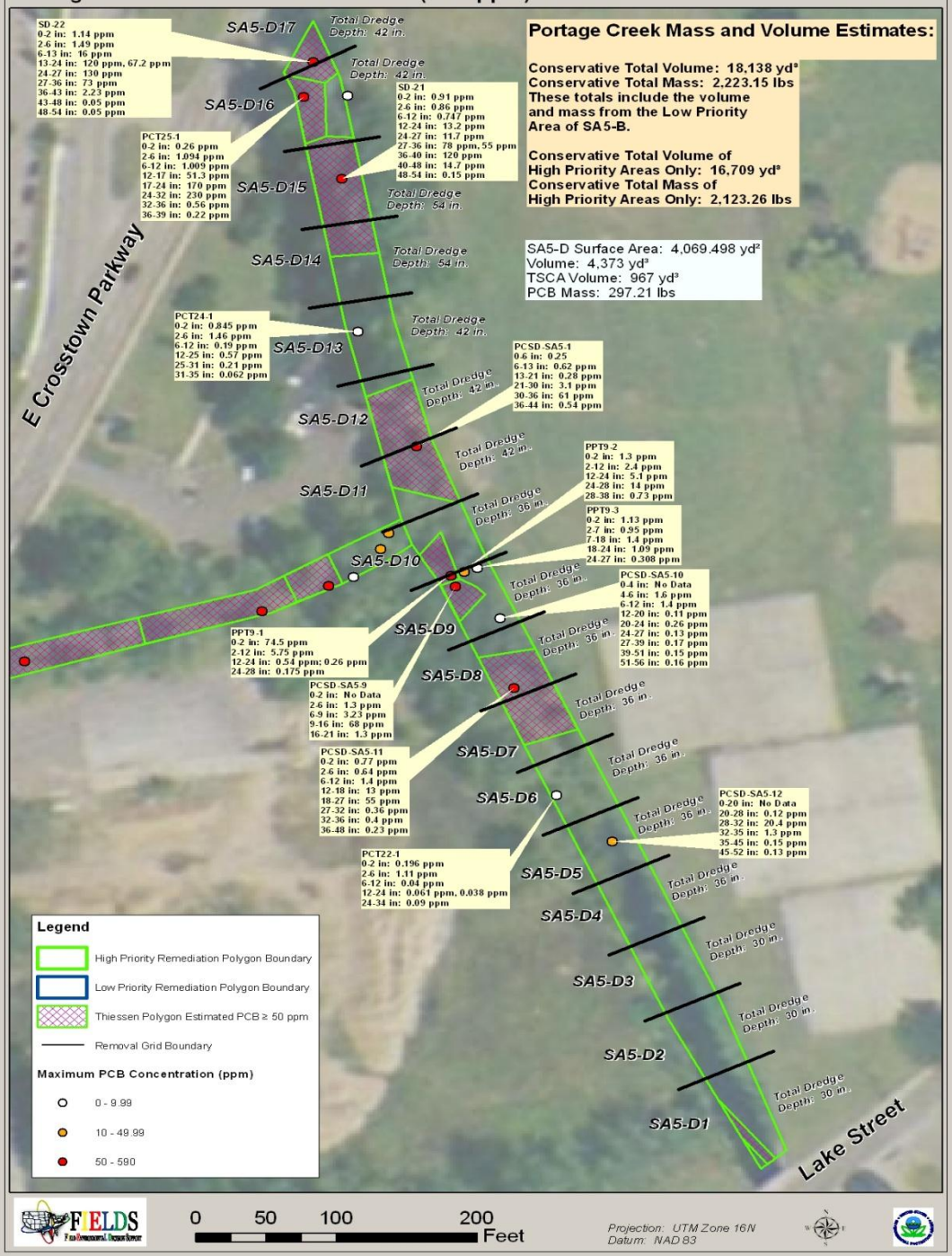
Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon SA6 (MDNRE SA6)

(Data summary from 1997, 2008 & 2010 data sets.)



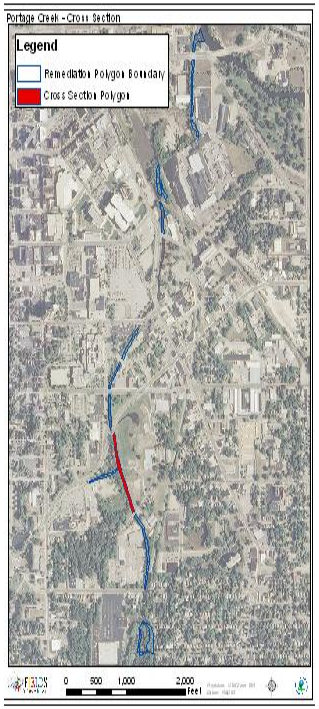
*NOTE: PCT17-3, SD-20, PPT11-2, PPT10-2 and PPT10-2 (1997) contained two samples at the same depth; both concentration values are included on the graph.

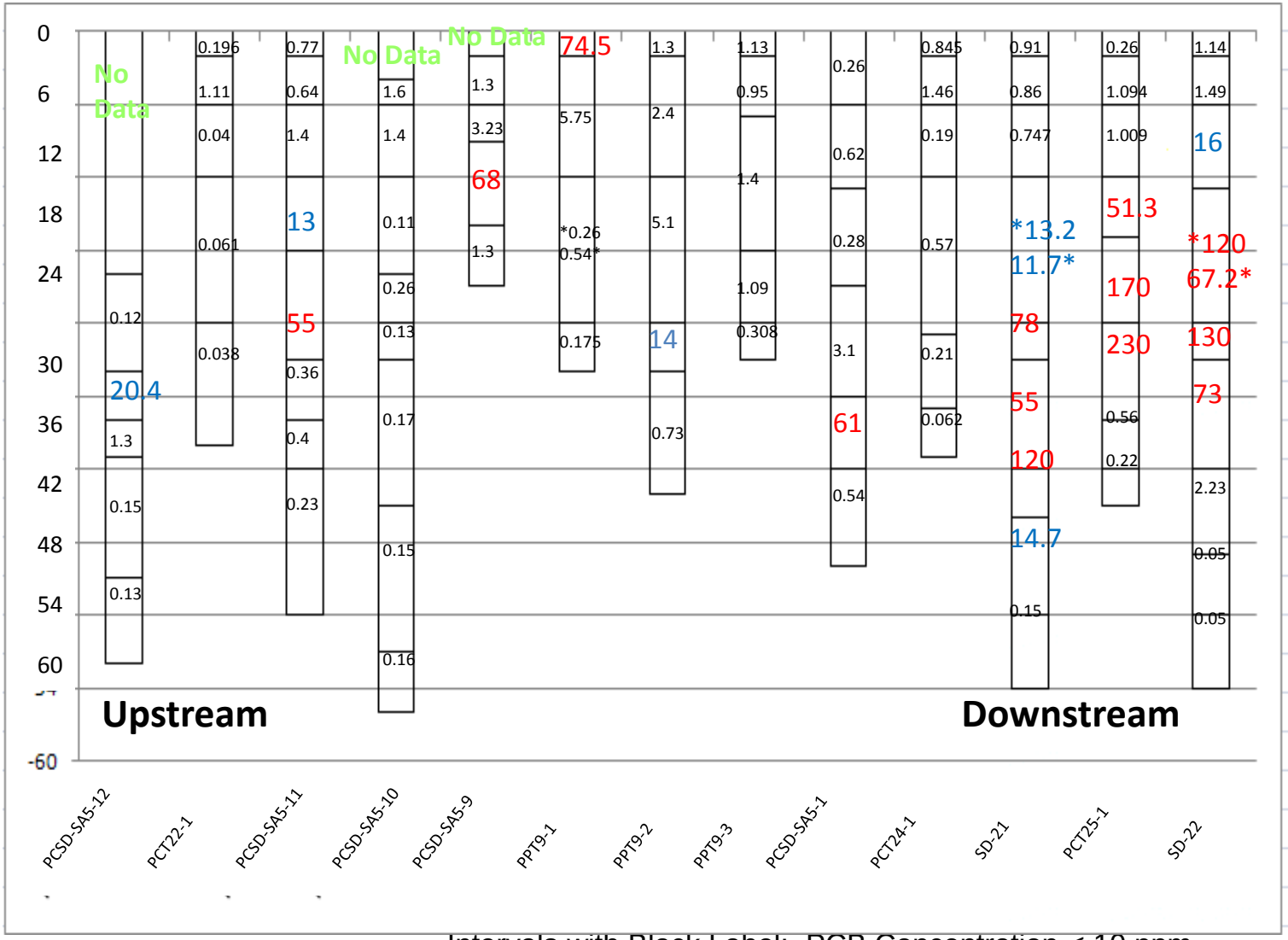
Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data


Portage Creek - Remediation Scenario (> 10 ppm): SA5-D
04/14/2011
Portage Creek Mass and Volume Estimates:
Conservative Total Volume: 18,138 yd³
Conservative Total Mass: 2,223.15 lbs
These totals include the volume and mass from the Low Priority Area of SA5-B.
Conservative Total Volume of High Priority Areas Only: 16,709 yd³
Conservative Total Mass of High Priority Areas Only: 2,123.26 lbs
SA5-D Surface Area: 4,069.498 yd²
Volume: 4,373 yd³
TSCA Volume: 967 yd³
PCB Mass: 297.21 lbs
SA5-D17
SA5-D16
SA5-D15
SA5-D14
SA5-D13
SA5-D12
SA5-D11
SA5-D10
SA5-D9
SA5-D8
SA5-D7
SA5-D6
SA5-D5
SA5-D4
SA5-D3
SA5-D2
SA5-D1
Total Dredge Depth: 42 in.
Total Dredge Depth: 54 in.
Total Dredge Depth: 36 in.
Total Dredge Depth: 30 in.
E Crosstown Parkway
Lake Street
SD-22
0-2 in: 1.14 ppm
2-6 in: 1.49 ppm
6-13 in: 16 ppm
13-24 in: 120 ppm, 67.2 ppm
24-27 in: 130 ppm
27-36 in: 73 ppm
36-43 in: 2.23 ppm
43-48 in: 0.05 ppm
48-54 in: 0.05 ppm
SD-21
0-2 in: 0.91 ppm
2-6 in: 0.86 ppm
6-12 in: 0.747 ppm
12-24 in: 13.2 ppm
24-27 in: 11.7 ppm
27-36 in: 78 ppm, 55 ppm
36-40 in: 120 ppm
40-48 in: 14.7 ppm
48-54 in: 0.15 ppm
PCT25-1
0-2 in: 0.26 ppm
2-6 in: 1.094 ppm
6-12 in: 1.009 ppm
12-17 in: 51.3 ppm
17-24 in: 170 ppm
24-32 in: 230 ppm
32-36 in: 0.56 ppm
36-39 in: 0.22 ppm
PCT24-1
0-2 in: 0.845 ppm
2-6 in: 1.46 ppm
6-12 in: 0.19 ppm
12-25 in: 0.57 ppm
25-31 in: 0.21 ppm
31-35 in: 0.062 ppm
PCSD-SA5-1
0-6 in: 0.25
6-13 in: 0.62 ppm
13-21 in: 0.28 ppm
21-30 in: 3.1 ppm
30-36 in: 61 ppm
36-44 in: 0.54 ppm
PPT9-2
0-2 in: 1.3 ppm
2-12 in: 2.4 ppm
12-24 in: 5.1 ppm
24-28 in: 14 ppm
28-38 in: 0.73 ppm
PPT9-3
0-2 in: 1.13 ppm
2-7 in: 0.95 ppm
7-18 in: 1.4 ppm
18-24 in: 1.09 ppm
24-27 in: 0.308 ppm
PCSD-SA5-10
0-4 in: No Data
4-6 in: 1.6 ppm
6-12 in: 1.4 ppm
12-20 in: 0.11 ppm
20-24 in: 0.26 ppm
24-27 in: 0.13 ppm
27-39 in: 0.17 ppm
39-51 in: 0.15 ppm
51-56 in: 0.16 ppm
PPT9-1
0-2 in: 74.5 ppm
2-12 in: 5.75 ppm
12-24 in: 0.54 ppm; 0.26 ppm
24-28 in: 0.175 ppm
PCSD-SA5-9
0-2 in: No Data
2-6 in: 1.3 ppm
6-9 in: 3.23 ppm
9-16 in: 68 ppm
16-21 in: 1.3 ppm
PCSD-SA5-11
0-2 in: 0.77 ppm
2-6 in: 0.64 ppm
6-12 in: 1.4 ppm
12-18 in: 13 ppm
18-27 in: 55 ppm
27-32 in: 0.36 ppm
32-36 in: 0.4 ppm
36-48 in: 0.23 ppm
PCSD-SA5-12
0-20 in: No Data
20-28 in: 0.12 ppm
28-32 in: 20.4 ppm
32-35 in: 1.3 ppm
35-45 in: 0.15 ppm
45-52 in: 0.13 ppm
PCT22-1
0-2 in: 0.196 ppm
2-6 in: 1.11 ppm
6-12 in: 0.04 ppm
12-24 in: 0.061 ppm, 0.038 ppm
24-34 in: 0.09 ppm
Legend
High Priority Remediation Polygon Boundary
Low Priority Remediation Polygon Boundary
Thiessen Polygon Estimated PCB ≥ 50 ppm
Removal Grid Boundary
Maximum PCB Concentration (ppm)
0 - 9.99
10 - 49.99
50 - 590
FIELDS
0 50 100 200 Feet
Projection: UTM Zone 16N
Datum: NAD 83

Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon SA5-D (MDNRE SA5)

(Data summary from 1997, 2008, & 2010 data sets.)



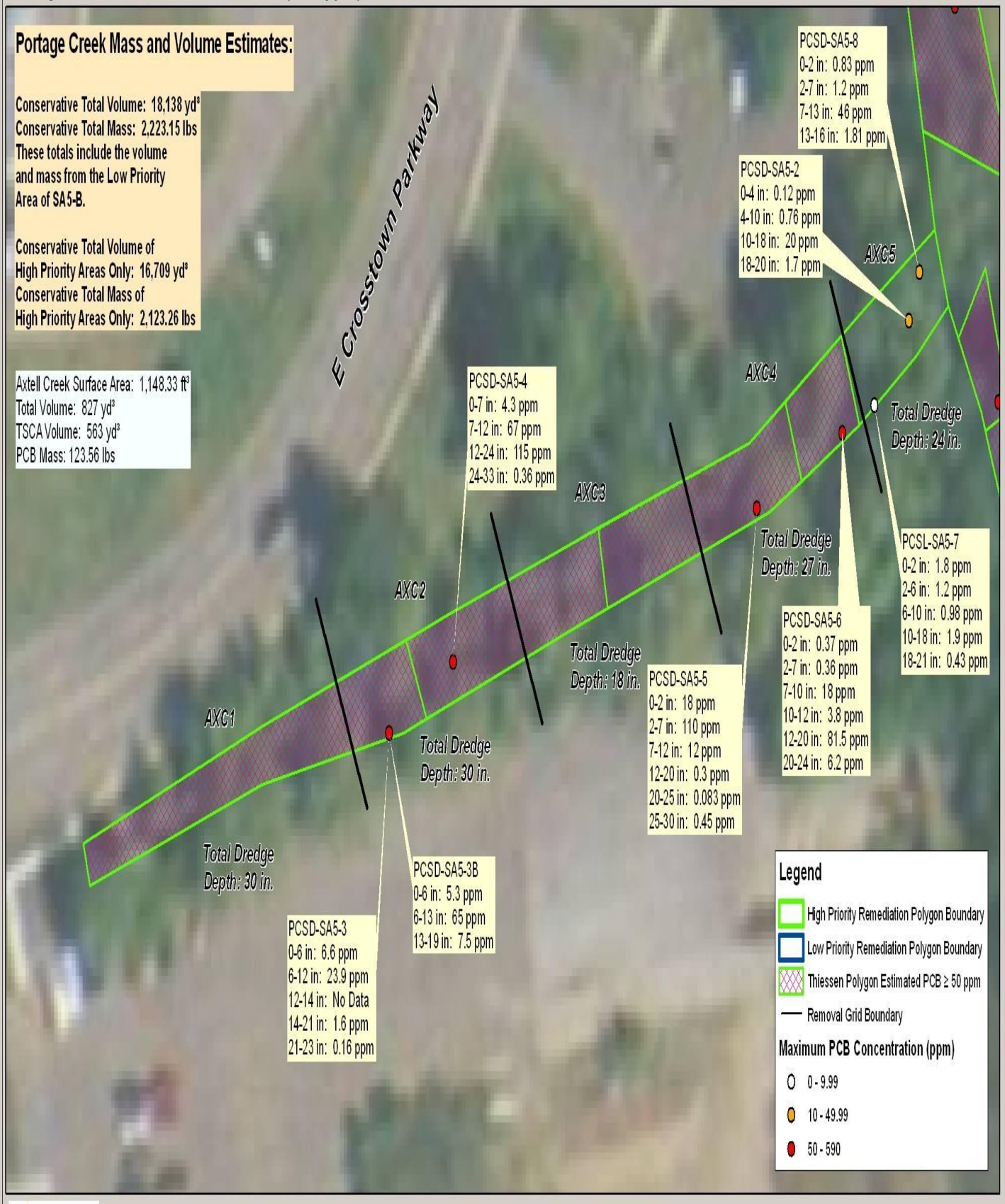


*NOTE:
SD-21, SD-22, and PPT1-1 contained two samples at the same depth; both concentration values are included on the graph.

Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data

Portage Creek - Remediation Scenario (> 10 ppm): Axtell Creek

04/14/2011

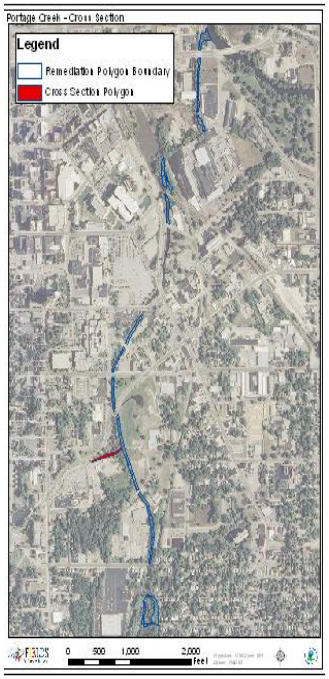


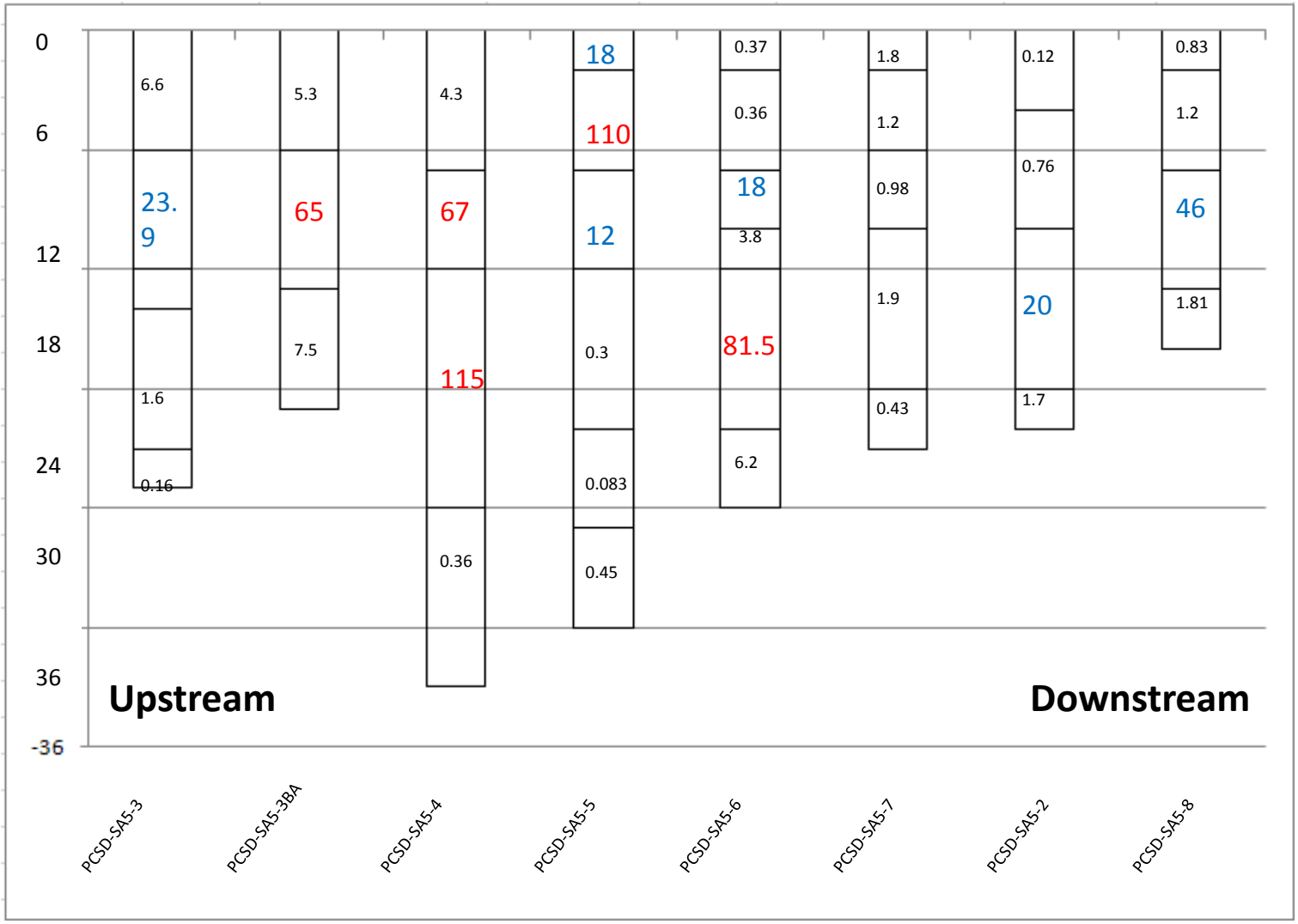
0 75 150 300 Feet

Projection: UTM Zone 16N
Datum: NAD 83

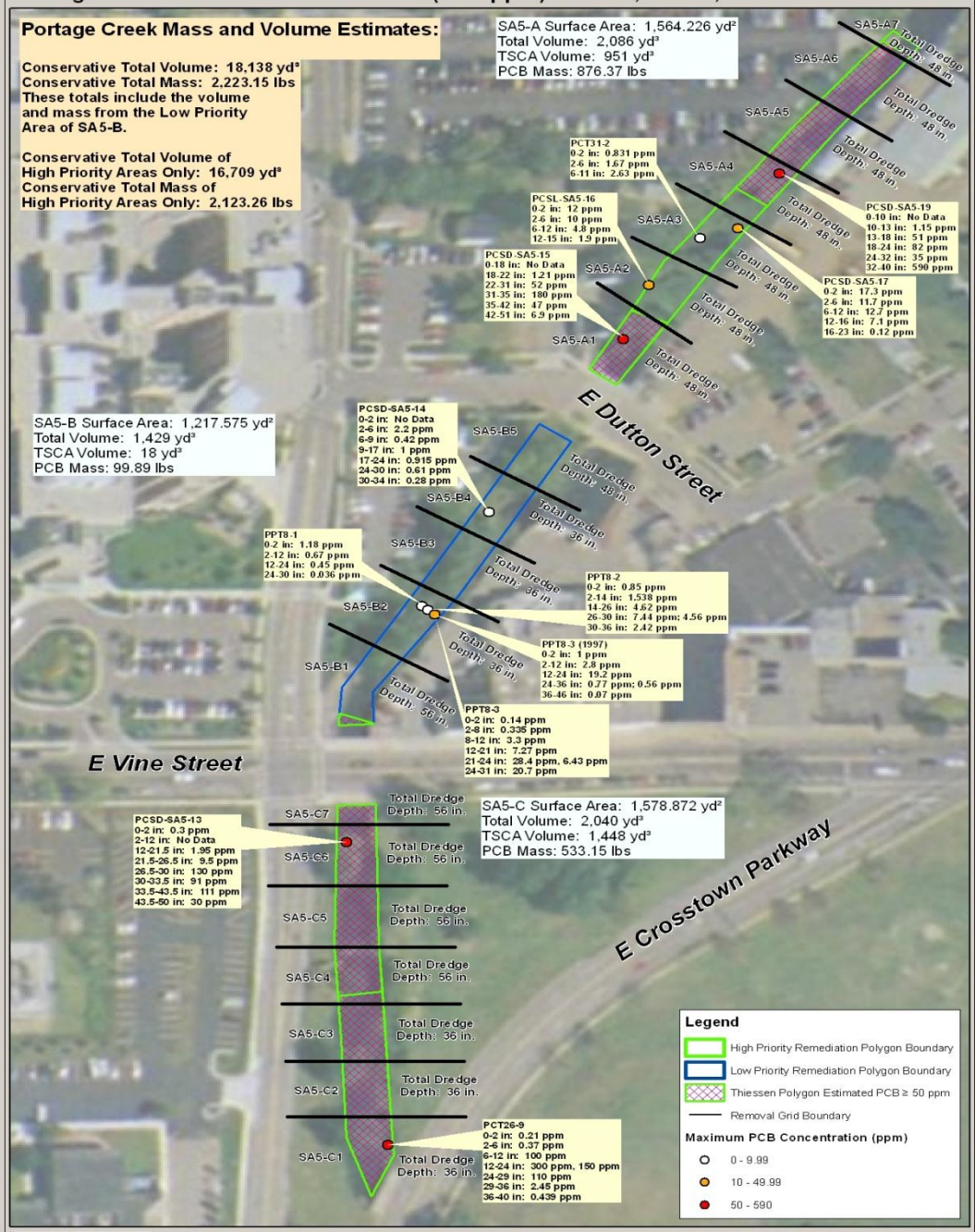
Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon Axtell Creek (MDNRE SA5)

(Data summary from 2008 & 2010 data sets.)



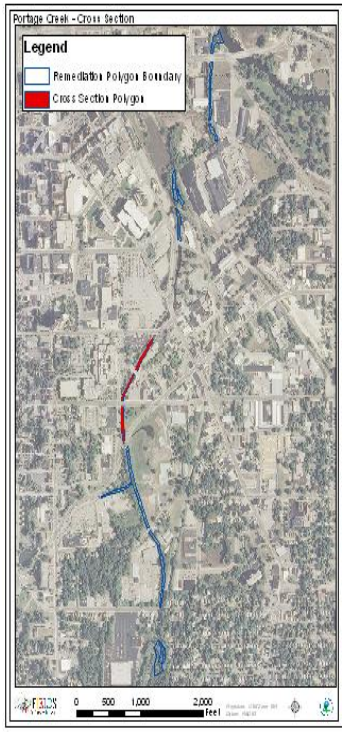


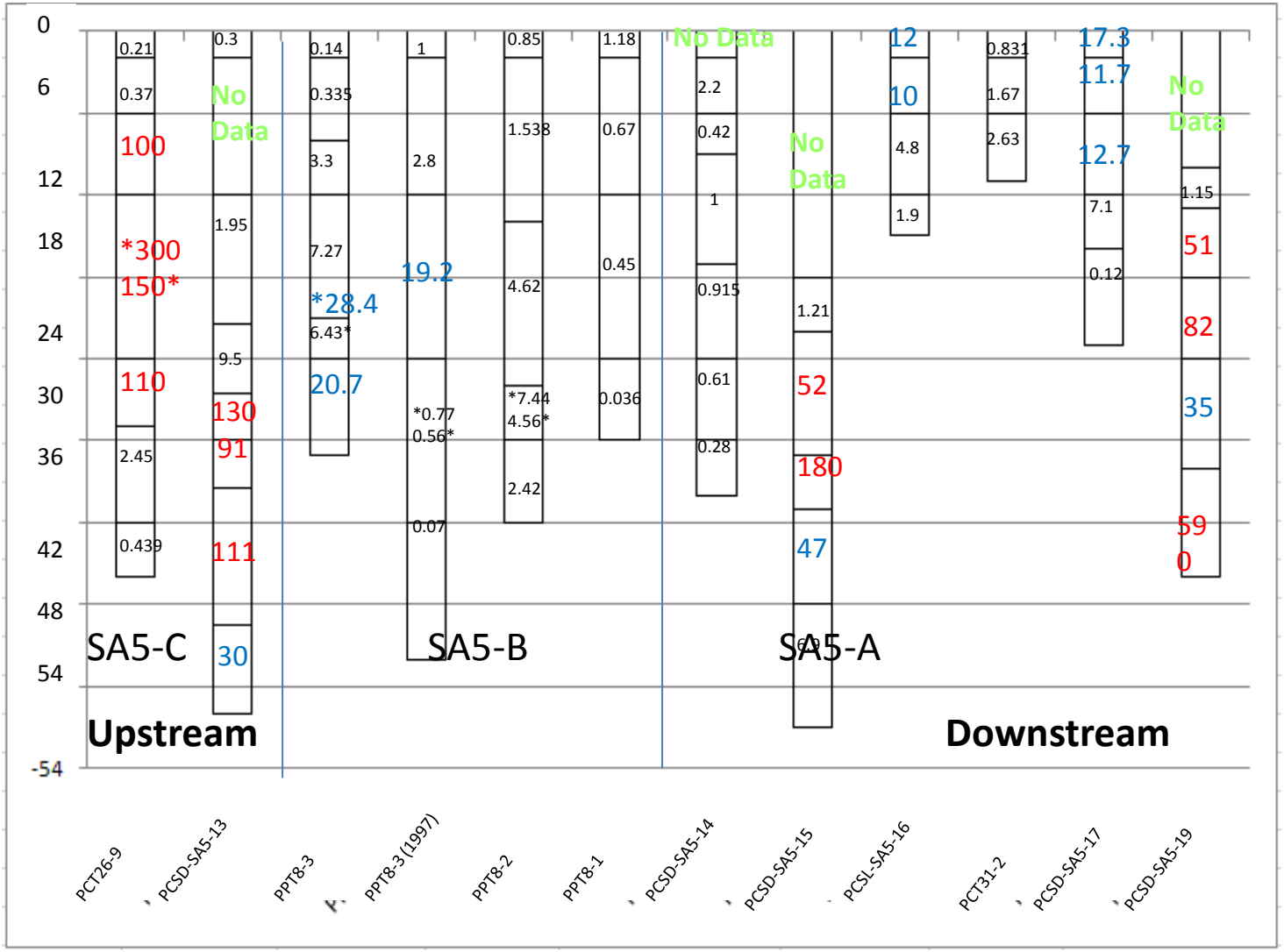
Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data


Portage Creek - Remediation Scenario (> 10 ppm): SA5-A, SA5-B, and SA5-C 04/14/2011
Portage Creek Mass and Volume Estimates:
Conservative Total Volume: 18,138 yd³
Conservative Total Mass: 2,223.15 lbs
These totals include the volume and mass from the Low Priority Area of SA5-B.
Conservative Total Volume of High Priority Areas Only: 16,709 yd³
Conservative Total Mass of High Priority Areas Only: 2,123.26 lbs
SA5-A Surface Area: 1,564.226 yd²
Total Volume: 2,086 yd³
TSCA Volume: 951 yd³
PCB Mass: 876.37 lbs
SA5-A7
SA5-A6
SA5-A5
SA5-A4
SA5-A3
SA5-A2
SA5-A1
Total Dredge Depth: 48 in.
PCT31-2
0-2 in: 0.831 ppm
2-6 in: 1.67 ppm
6-11 in: 2.63 ppm
PCSL-SA5-16
0-2 in: 12 ppm
2-6 in: 10 ppm
6-12 in: 4.8 ppm
12-15 in: 1.9 ppm
PCSD-SA5-19
0-10 in: No Data
10-13 in: 1.15 ppm
13-18 in: 51 ppm
18-24 in: 82 ppm
24-32 in: 35 ppm
32-40 in: 590 ppm
PCSD-SA5-15
0-18 in: No Data
18-22 in: 1.21 ppm
22-31 in: 52 ppm
31-35 in: 180 ppm
35-42 in: 47 ppm
42-51 in: 6.9 ppm
PCSD-SA5-17
0-2 in: 17.3 ppm
2-6 in: 11.7 ppm
6-12 in: 12.7 ppm
12-16 in: 7.1 ppm
16-23 in: 0.12 ppm
E Dutton Street
SA5-B Surface Area: 1,217.575 yd²
Total Volume: 1,429 yd³
TSCA Volume: 18 yd³
PCB Mass: 99.89 lbs
PCSD-SA5-14
0-2 in: No Data
2-6 in: 2.2 ppm
6-9 in: 0.42 ppm
9-17 in: 1 ppm
17-24 in: 0.915 ppm
24-30 in: 0.61 ppm
30-34 in: 0.28 ppm
SA5-B5
SA5-B4
SA5-B3
SA5-B2
SA5-B1
Total Dredge Depth: 48 in.
Total Dredge Depth: 36 in.
Total Dredge Depth: 56 in.
PPT8-1
0-2 in: 1.18 ppm
2-12 in: 0.67 ppm
12-24 in: 0.45 ppm
24-30 in: 0.036 ppm
PPT8-2
0-2 in: 0.85 ppm
2-14 in: 1.538 ppm
14-26 in: 4.62 ppm
26-30 in: 7.44 ppm; 4.56 ppm
30-36 in: 2.42 ppm
PPT8-3 (1997)
0-2 in: 1 ppm
2-12 in: 2.8 ppm
12-24 in: 19.2 ppm
24-36 in: 0.77 ppm; 0.56 ppm
36-46 in: 0.07 ppm
PPT8-3
0-2 in: 0.14 ppm
2-8 in: 0.335 ppm
8-12 in: 3.3 ppm
12-21 in: 7.27 ppm
21-24 in: 28.4 ppm, 6.43 ppm
24-31 in: 20.7 ppm
E Vine Street
SA5-C Surface Area: 1,578.872 yd²
Total Volume: 2,040 yd³
TSCA Volume: 1,448 yd³
PCB Mass: 533.15 lbs
PCSD-SA5-13
0-2 in: 0.3 ppm
2-12 in: No Data
12-21.5 in: 1.95 ppm
21.5-26.5 in: 9.5 ppm
26.5-30 in: 130 ppm
30-33.5 in: 91 ppm
33.5-43.5 in: 111 ppm
43.5-50 in: 30 ppm
SA5-C7
SA5-C6
SA5-C5
SA5-C4
SA5-C3
SA5-C2
SA5-C1
Total Dredge Depth: 56 in.
Total Dredge Depth: 36 in.
PCT26-9
0-2 in: 0.21 ppm
2-6 in: 0.37 ppm
6-12 in: 100 ppm
12-24 in: 300 ppm, 150 ppm
24-29 in: 110 ppm
29-36 in: 2.45 ppm
36-40 in: 0.439 ppm
E Crosstown Parkway
Legend
High Priority Remediation Polygon Boundary
Low Priority Remediation Polygon Boundary
Thiessen Polygon Estimated PCB ≥ 50 ppm
Removal Grid Boundary
Maximum PCB Concentration (ppm)
0 - 9.99
10 - 49.99
50 - 590
FIELDS
0 75 150 300 Feet
Projection: UTM Zone 16N
Datum: NAD 83

Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygons SA5-A, B, and C (MDNRE SA5)

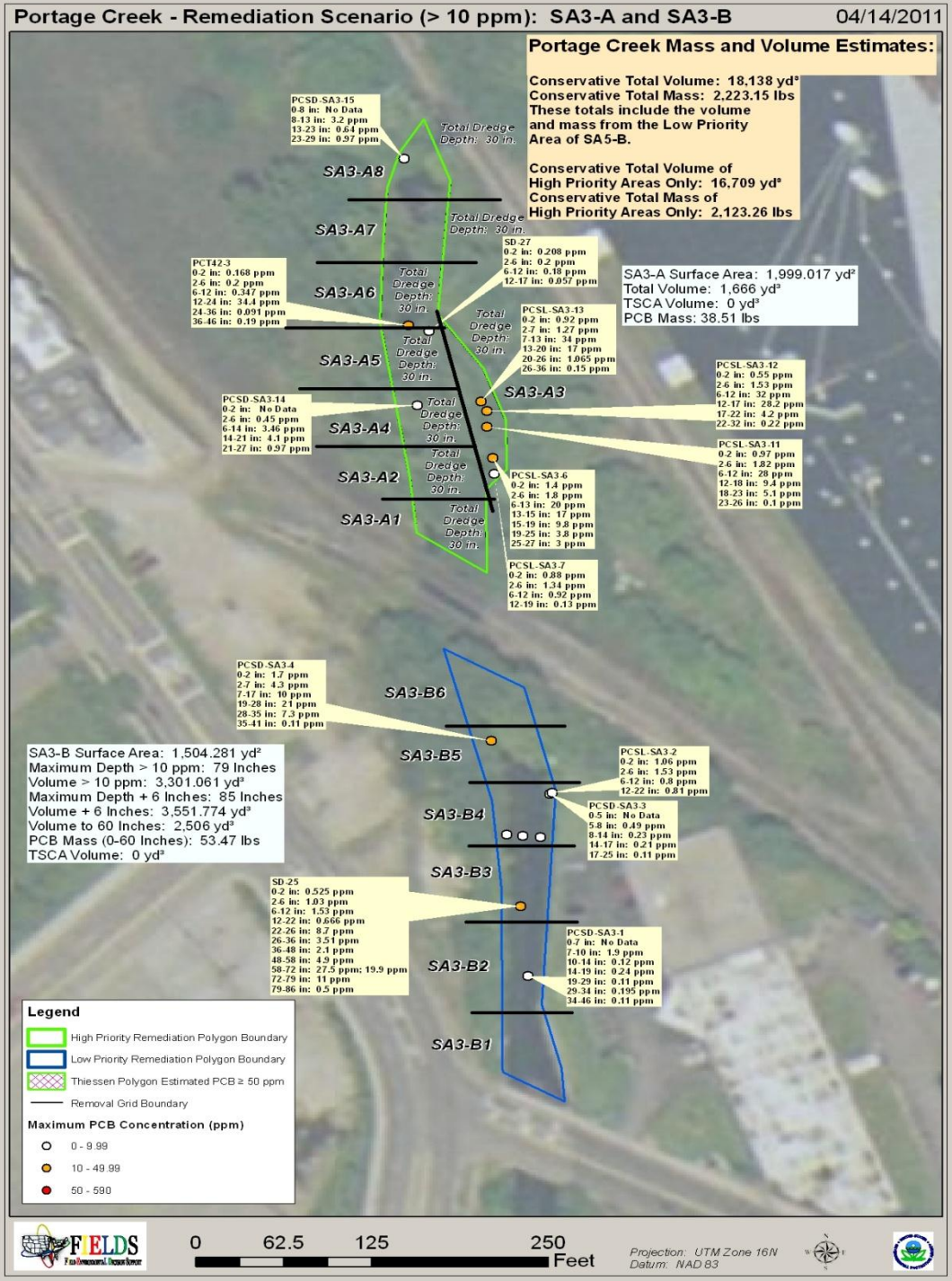
(Data summary from 1997. 2008, & 2010 data sets.)





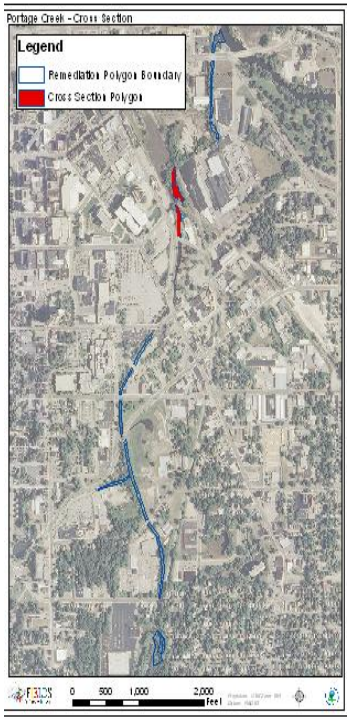
*NOTE: PCT26-9, PPT8-3, PPT8-3 (1997), and PPT8-2 contained two samples at the same depth; both concentration values are included on the graph.

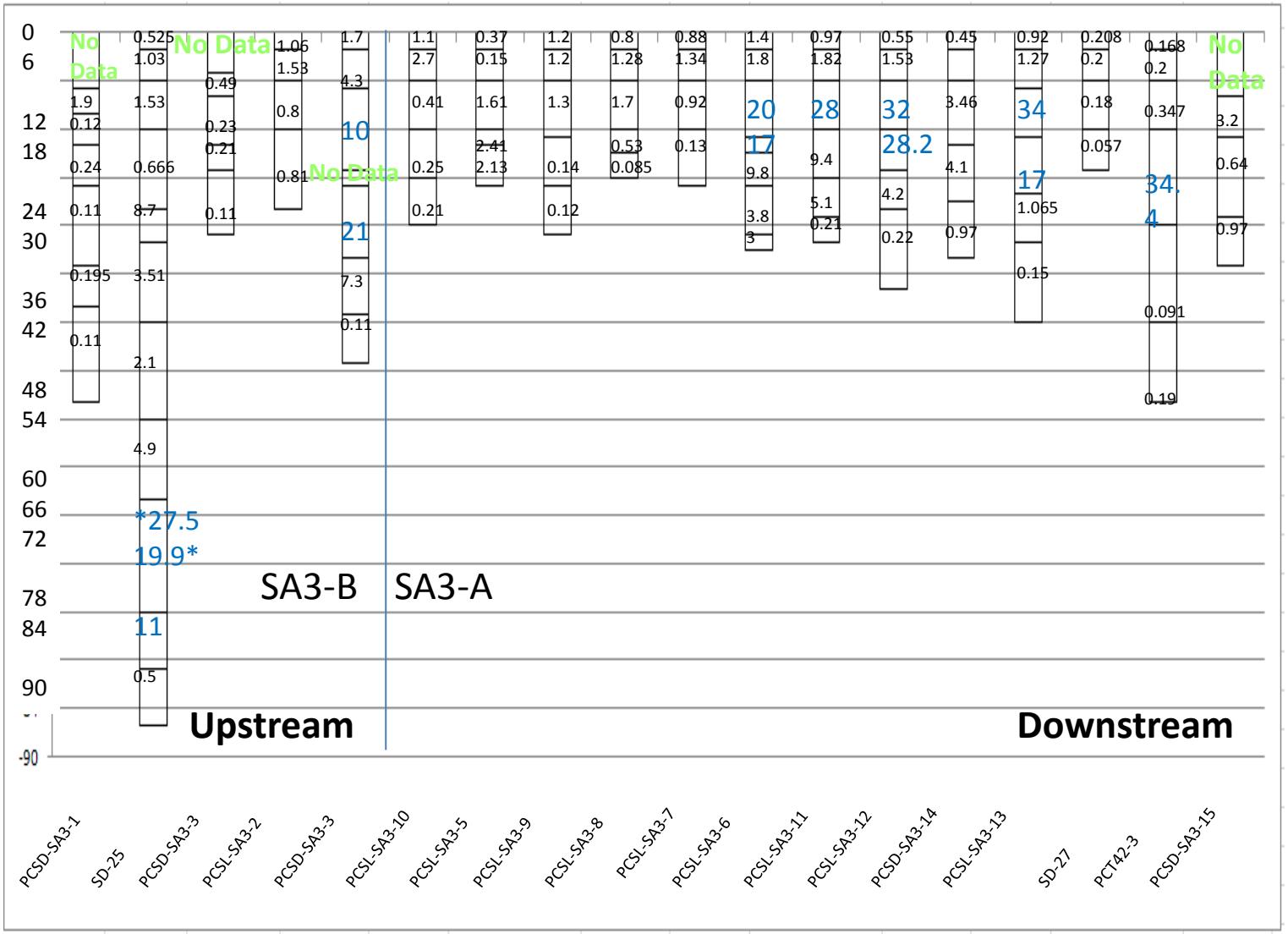
Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data


Portage Creek - Remediation Scenario (> 10 ppm): SA3-A and SA3-B
04/14/2011
Portage Creek Mass and Volume Estimates:
Conservative Total Volume: 18,138 yd³
Conservative Total Mass: 2,223.15 lbs
These totals include the volume and mass from the Low Priority Area of SA5-B.
Conservative Total Volume of High Priority Areas Only: 16,709 yd³
Conservative Total Mass of High Priority Areas Only: 2,123.26 lbs
SA3-A Surface Area: 1,999.017 yd²
Total Volume: 1,666 yd³
TSCA Volume: 0 yd³
PCB Mass: 38.51 lbs
SA3-B Surface Area: 1,504.281 yd²
Maximum Depth > 10 ppm: 79 Inches
Volume > 10 ppm: 3,301.061 yd³
Maximum Depth + 6 Inches: 85 Inches
Volume + 6 Inches: 3,551.774 yd³
Volume to 60 Inches: 2,506 yd³
PCB Mass (0-60 Inches): 53.47 lbs
TSCA Volume: 0 yd³
SA3-A8
SA3-A7
SA3-A6
SA3-A5
SA3-A4
SA3-A3
SA3-A2
SA3-A1
SA3-B6
SA3-B5
SA3-B4
SA3-B3
SA3-B2
SA3-B1
Total Dredge Depth: 30 in.
PCSD-SA3-15
0-8 in: No Data
8-13 in: 3.2 ppm
13-23 in: 0.64 ppm
23-29 in: 0.97 ppm
SD-27
0-2 in: 0.208 ppm
2-6 in: 0.2 ppm
6-12 in: 0.18 ppm
12-17 in: 0.057 ppm
PCT42-3
0-2 in: 0.168 ppm
2-6 in: 0.2 ppm
6-12 in: 0.347 ppm
12-24 in: 34.4 ppm
24-36 in: 0.091 ppm
36-46 in: 0.19 ppm
PCSL-SA3-13
0-2 in: 0.92 ppm
2-7 in: 1.27 ppm
7-13 in: 34 ppm
13-20 in: 17 ppm
20-26 in: 1.065 ppm
26-36 in: 0.15 ppm
PCSL-SA3-12
0-2 in: 0.55 ppm
2-6 in: 1.53 ppm
6-12 in: 32 ppm
12-17 in: 28.2 ppm
17-22 in: 4.2 ppm
22-32 in: 0.22 ppm
PCSD-SA3-14
0-2 in: No Data
2-6 in: 0.45 ppm
6-14 in: 3.46 ppm
14-21 in: 4.1 ppm
21-27 in: 0.97 ppm
PCSL-SA3-11
0-2 in: 0.97 ppm
2-6 in: 1.82 ppm
6-12 in: 28 ppm
12-18 in: 9.4 ppm
18-23 in: 5.1 ppm
23-26 in: 0.1 ppm
PCSL-SA3-6
0-2 in: 1.4 ppm
2-6 in: 1.8 ppm
6-13 in: 20 ppm
13-15 in: 17 ppm
15-19 in: 9.8 ppm
19-25 in: 3.8 ppm
25-27 in: 3 ppm
PCSL-SA3-7
0-2 in: 0.88 ppm
2-6 in: 1.34 ppm
6-12 in: 0.92 ppm
12-19 in: 0.13 ppm
PCSD-SA3-4
0-2 in: 1.7 ppm
2-7 in: 4.3 ppm
7-17 in: 10 ppm
19-28 in: 21 ppm
28-35 in: 7.3 ppm
35-41 in: 0.11 ppm
PCSL-SA3-2
0-2 in: 1.06 ppm
2-6 in: 1.53 ppm
6-12 in: 0.8 ppm
12-22 in: 0.81 ppm
PCSD-SA3-3
0-5 in: No Data
5-8 in: 0.49 ppm
8-14 in: 0.23 ppm
14-17 in: 0.21 ppm
17-25 in: 0.11 ppm
SD-25
0-2 in: 0.525 ppm
2-6 in: 1.03 ppm
6-12 in: 1.53 ppm
12-22 in: 0.666 ppm
22-26 in: 8.7 ppm
26-36 in: 3.51 ppm
36-48 in: 2.1 ppm
48-58 in: 4.9 ppm
58-72 in: 27.5 ppm; 19.9 ppm
72-79 in: 11 ppm
79-86 in: 0.5 ppm
PCSD-SA3-1
0-7 in: No Data
7-10 in: 1.9 ppm
10-14 in: 0.12 ppm
14-19 in: 0.24 ppm
19-29 in: 0.11 ppm
29-34 in: 0.195 ppm
34-46 in: 0.11 ppm
Legend
High Priority Remediation Polygon Boundary
Low Priority Remediation Polygon Boundary
Thiessen Polygon Estimated PCB ≥ 50 ppm
Removal Grid Boundary
Maximum PCB Concentration (ppm)
0 - 9.99
10 - 49.99
50 - 590
0
62.5
125
250
Feet
Projection: UTM Zone 16N
Datum: NAD 83

Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygons SA3-A and B (MDNRE SA3)

(Data summary from 2008 & 2010 data sets.)



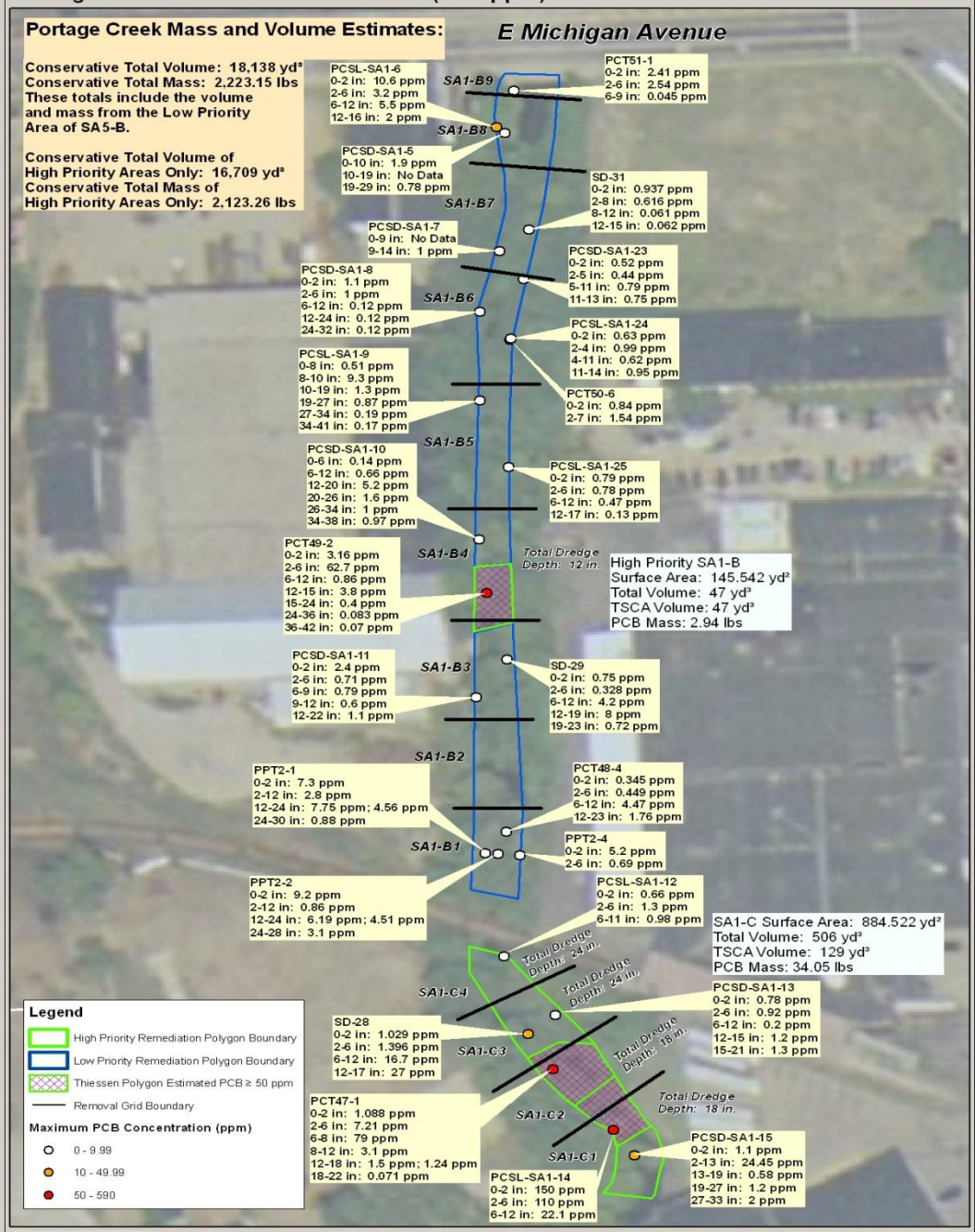


*NOTE:
SD-25 contained two samples at the same depth; both concentration values are included on the graph.

Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data

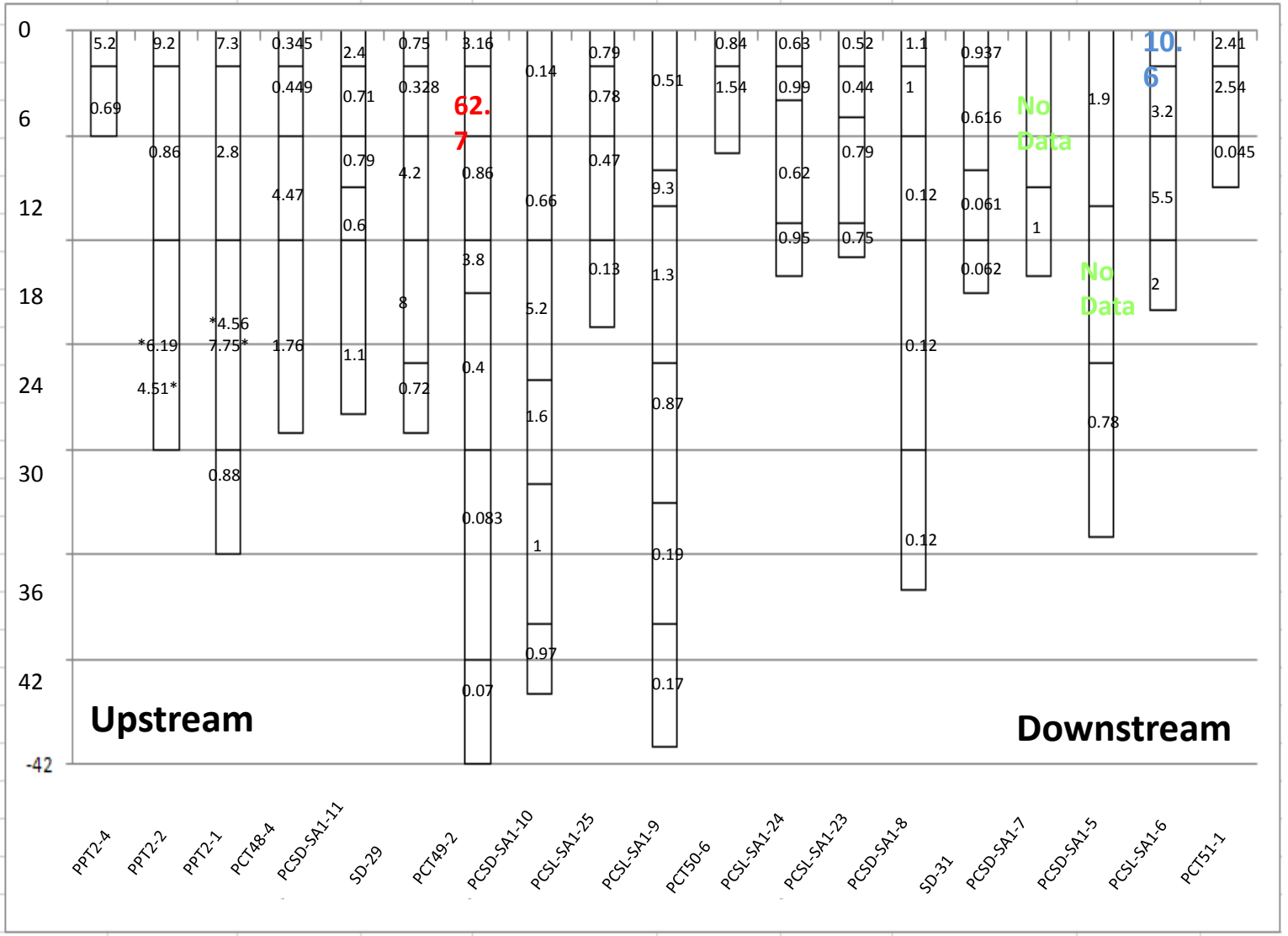
Portage Creek - Remediation Scenario (> 10 ppm): SA1-B and SA1-C

04/14/2011



Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon SA1-B (MDNRE SA1)

(Data summary from 1997, 2008, & 2010 data sets.)

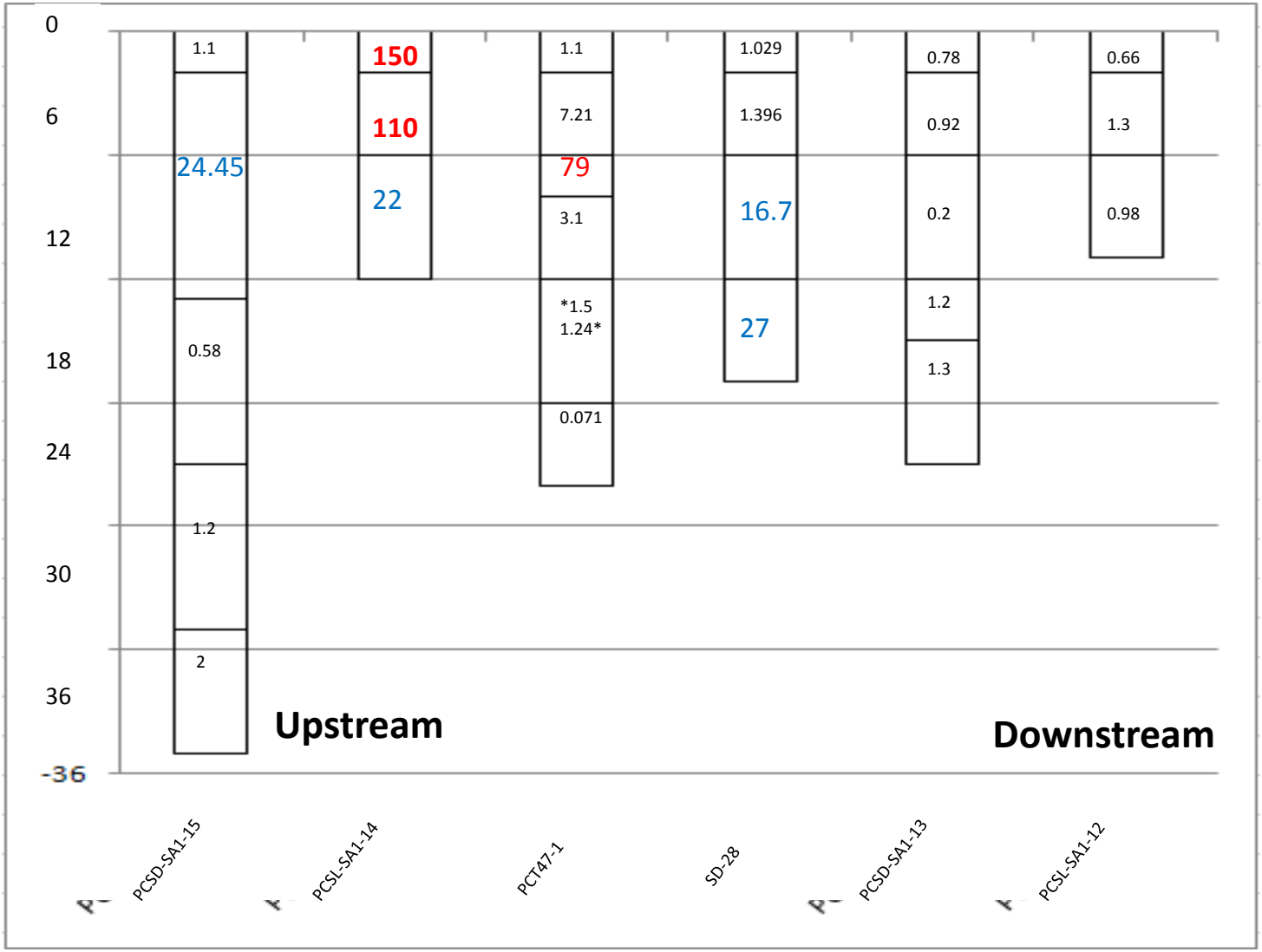


*NOTE:
PPT2-2 and PPT2-1 contained two samples at the same depth; both concentration values are included on the graph.

Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data

Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon SA1-C (MDNRE SA1)

(Data summary from 2008 & 2010 data sets.)

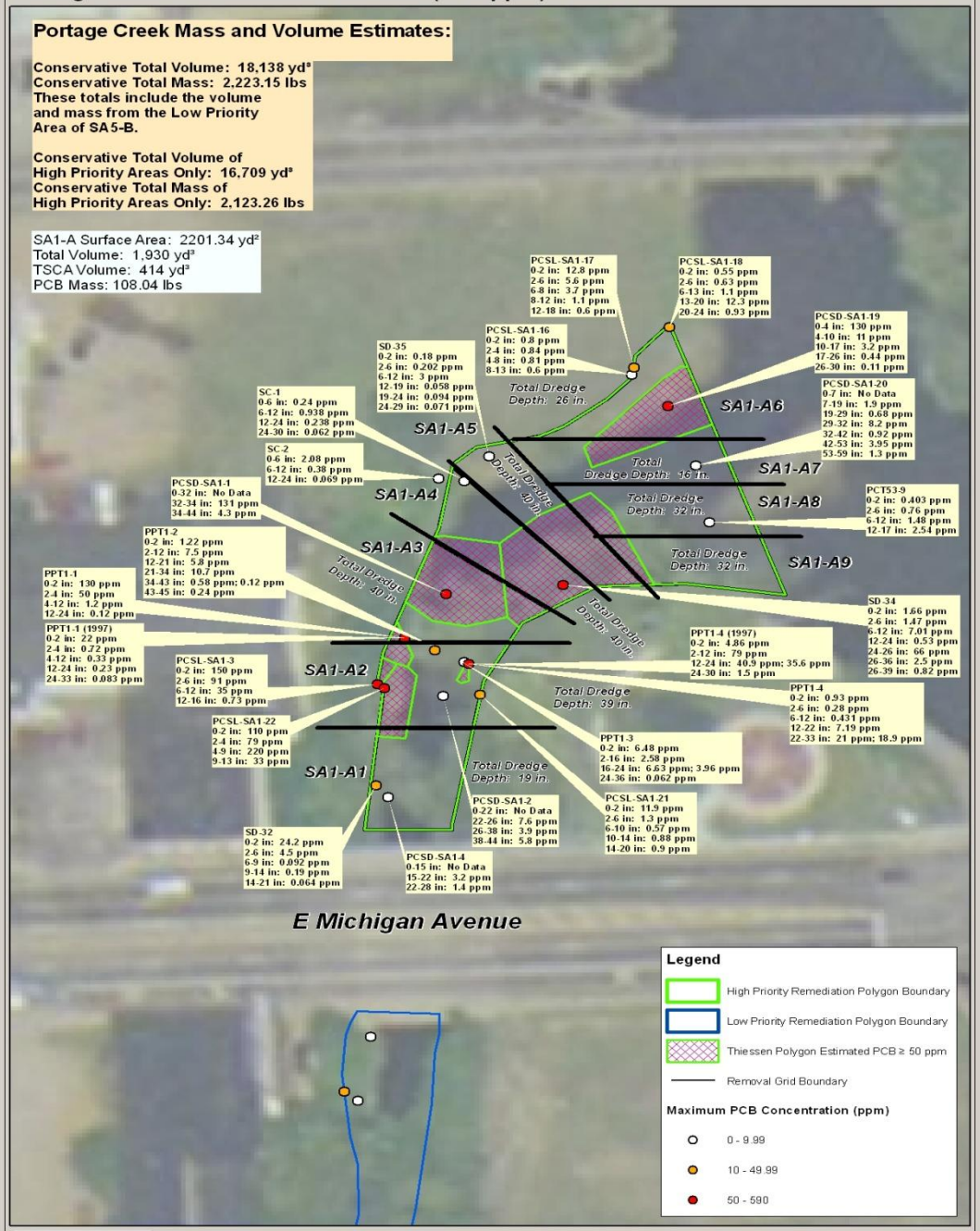


*NOTE:
PCT47-1 contained two samples at the same depth; both concentration values are included on the graph.

Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data

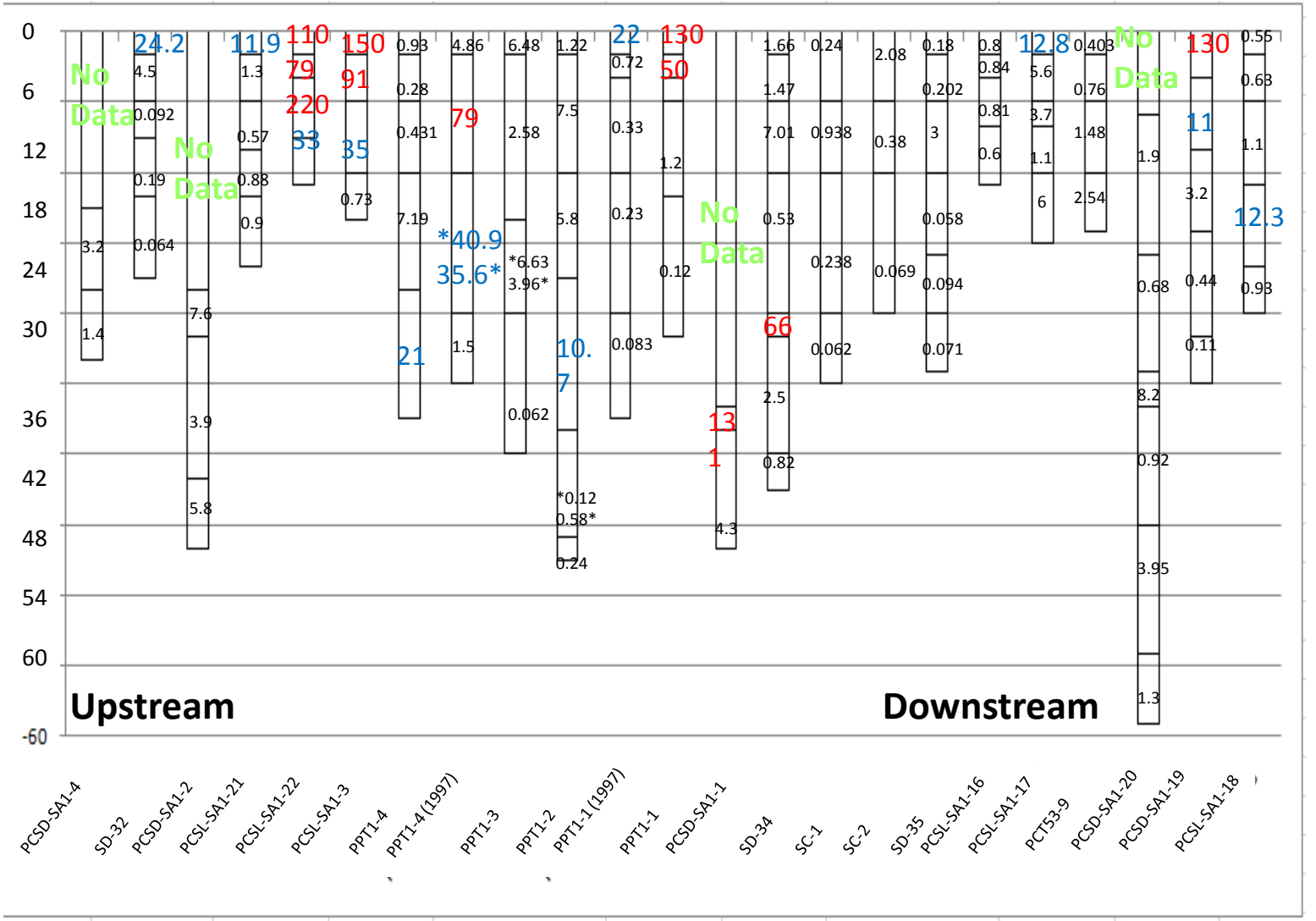
Portage Creek - Remediation Scenario (> 10 ppm): SA1-A

04/14/2011



Cross-Section: PCB Concentration (ppm) and Depth (inches) Intervals in Remediation Polygon SA1-A (MDNRE SA1)

(Data summary from 1994, 1997, 2008 & 2010 data sets.)



*NOTE:
PPT1-4 (1997), PPT1-3, and PPT1-2 contained two samples at the same depth; both concentration values are included on the graph.

Intervals with Black Label: PCB Concentration < 10 ppm
Intervals with Blue Label: PCB Concentration between 10 – 49.99 ppm
Intervals with Red Label: PCB Concentration ≥ 50 ppm
Intervals with Green Label: No Data

SA 6 Sediment Removal Operations Overview

Site Preparation

- Clear & grub for access
- Pre-Survey (Structural feature, engineering, precondition photo documentation, Topographic/bathymetric)
- Access construction
- Area Specific Controls (Security, Environmental, H&S)
- Isolation
    - Task 1- cofferdam construction
    - Task 2- by-pass pumping ongoing during Contaminated Sediment Removal (CSR)
    - Task 3- excavation area dewatering and water treatment (ongoing during CSR)(Initial pump out, vacuum dewatering)

Overview Cont.

Contaminated sediment removal

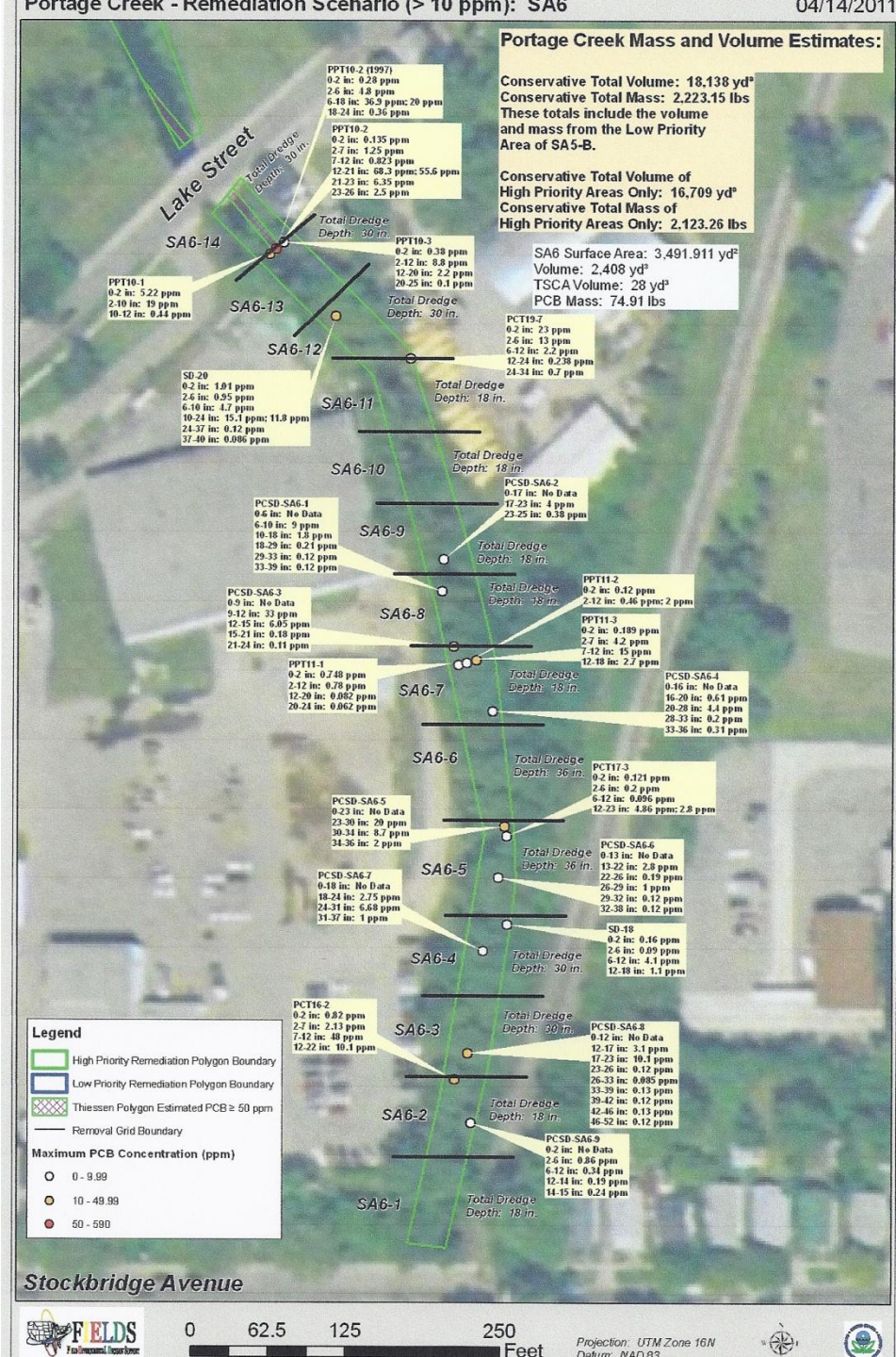
- Preliminary solidification/Load & transfer sediment to dewatering pad
- Final stabilization/solidification for disposal/2ndary staging for shipment
- Load out for disposal (subtitle D, or TSCA landfill)
- Verification sampling/re-excavate and resample as needed
- Post removal survey (Structural feature, Topographic/bathymetric)

Site Restoration

- Backfill stream channel/bank
- Cofferdam removal
- Removal area restoration planting
- Infrastructure restoration activities (fence replacement, asphalt repairs, etc.)
- Remove sediment erosion controls after re-vegetation
- Post condition photo documentation

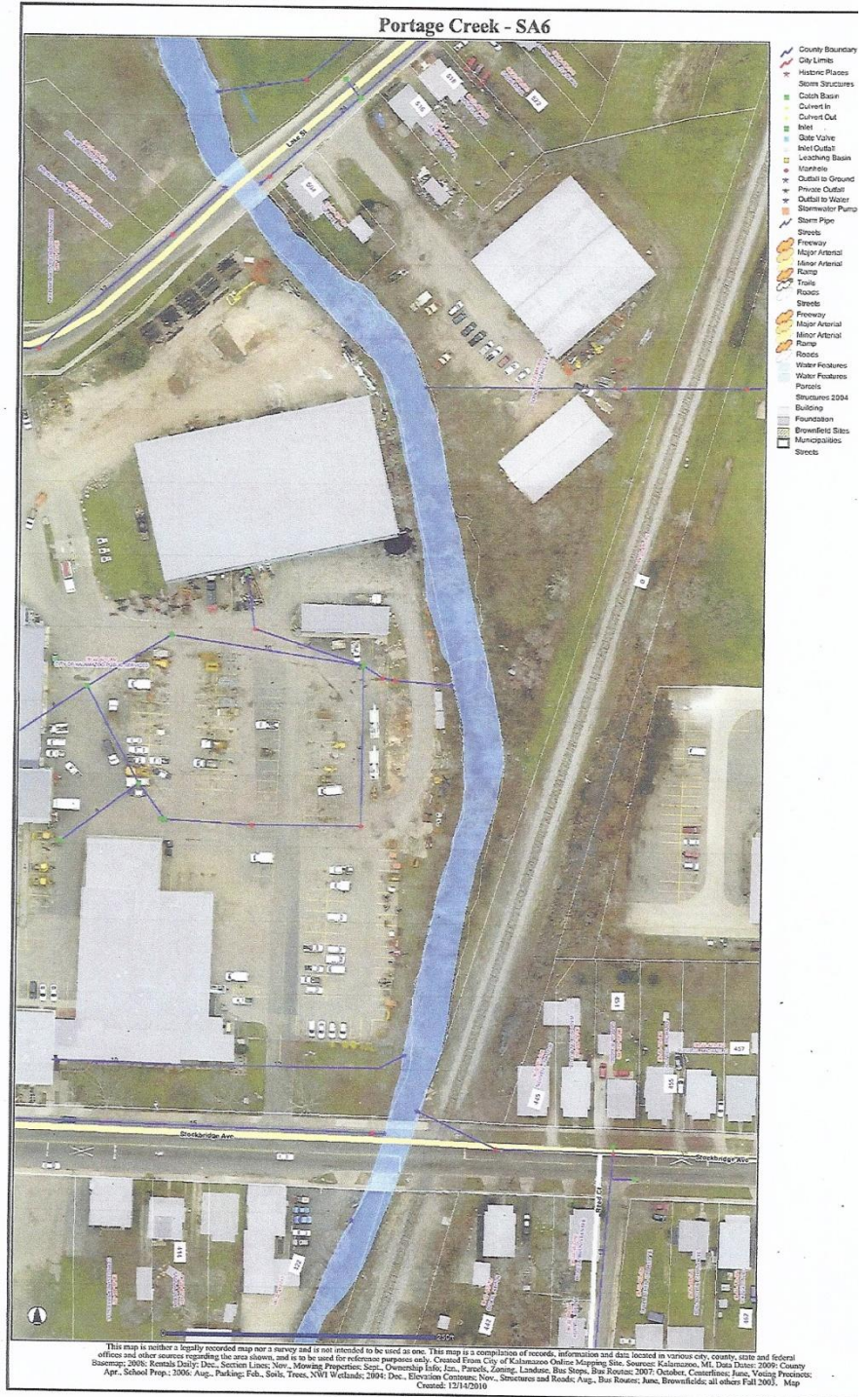
Summary of SA 6 Dredge Area Information

- Creek section from Stockbridge Avenue bridge north to Lake Street bridge
- Subdivided into 14 grid segments, SA 6-1 through SA 6-14
- Approximately 895 feet long
- Grid SA 6-1 & SA 6-2 dredged to 18” below current creek bottom elevation (BCCBE)
- Grid SA 6-3 & SA 6-4 dredged to 30” BCCBE
- Grid SA 6-5 & SA 6-6 dredged to 36” BCCBE
- Grid SA 6-7 through SA 6-11 dredged to 18” BCCBE
- Grid SA 6-12 through SA 6-14 dredged to 30” BCCBE
- ***Note*** *– data gap sampling will be completed prior to excavation to confirm dredge depths.*



SA 6 CSR Site Specific Challenges

- Only practical access is from the west in active public works yard
- West creek bank is heavily vegetated
- Minimal flat working space for site operations
- Low hanging high voltage lines present over large segment of creek channel work area
- No workable creek bank access for the northern 355’ of the removal area (SE Corner of large building adjacent to creek to Lake Street bridge)
- Moving/storing materials on site
- Removing waste sediment from site

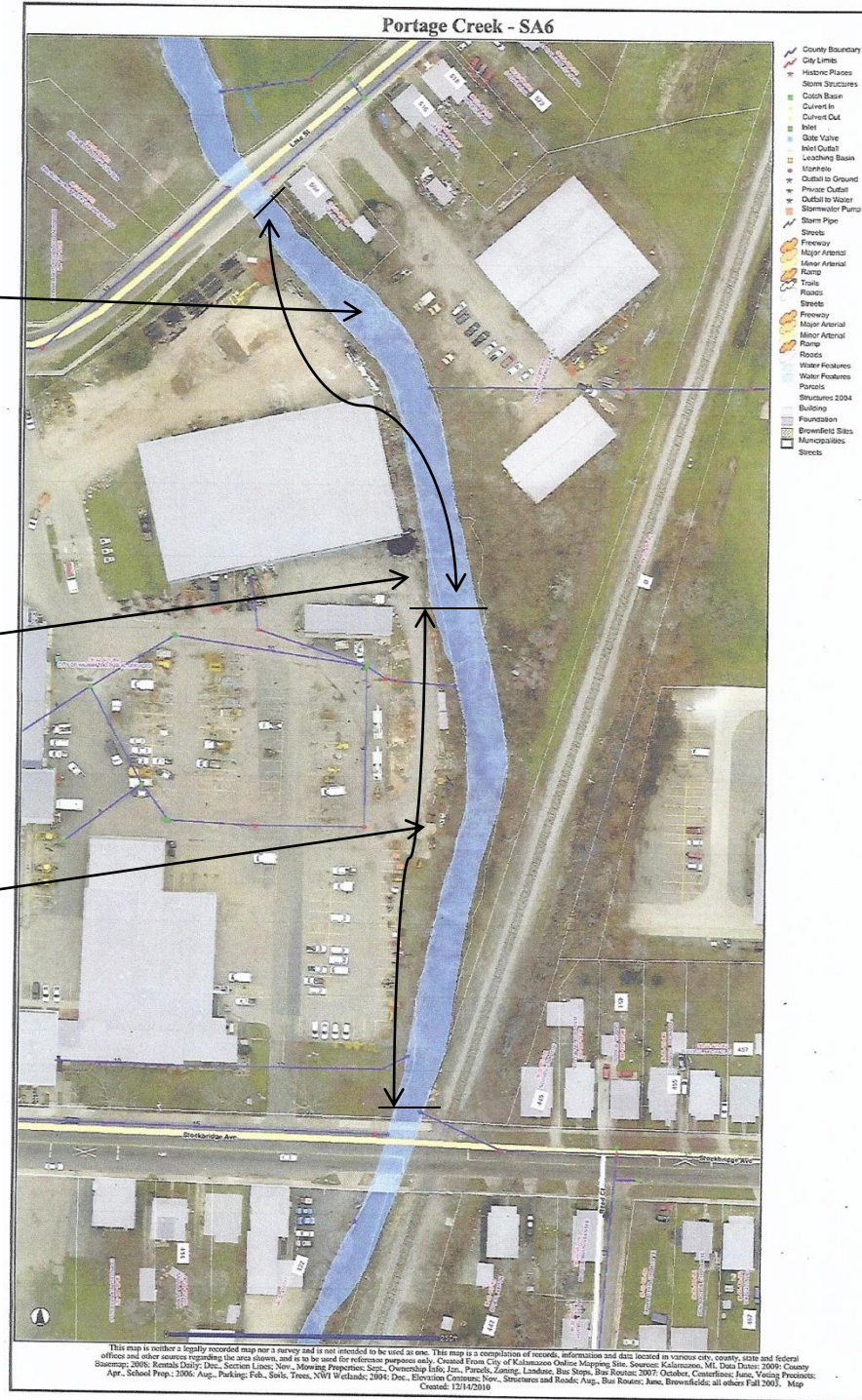


SA 6 CSR Proposed General Approach

Removal Area 2- Excavate sediments from within the creek channel using excavator, HDPE road mat roadway down center of creek and tracked crawler carriers to remove material to solidification and load out area

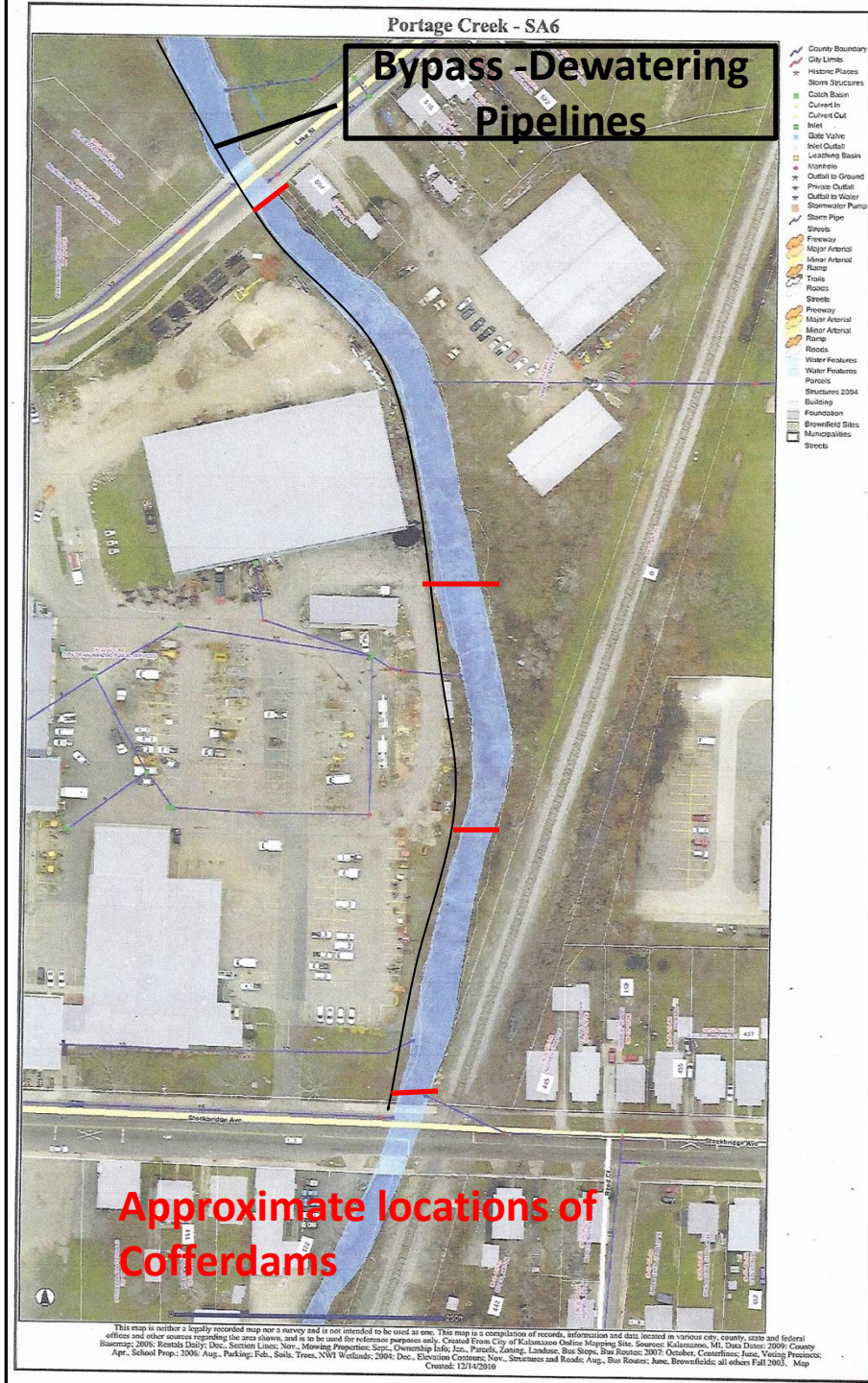
Creek access for Removal Area 2 proposed to take place through here

Removal Area 1- Excavate sediments from bank with long reach excavator, transfer to “stone miser” box for solidification and load out with second excavator into transfer dump trucks



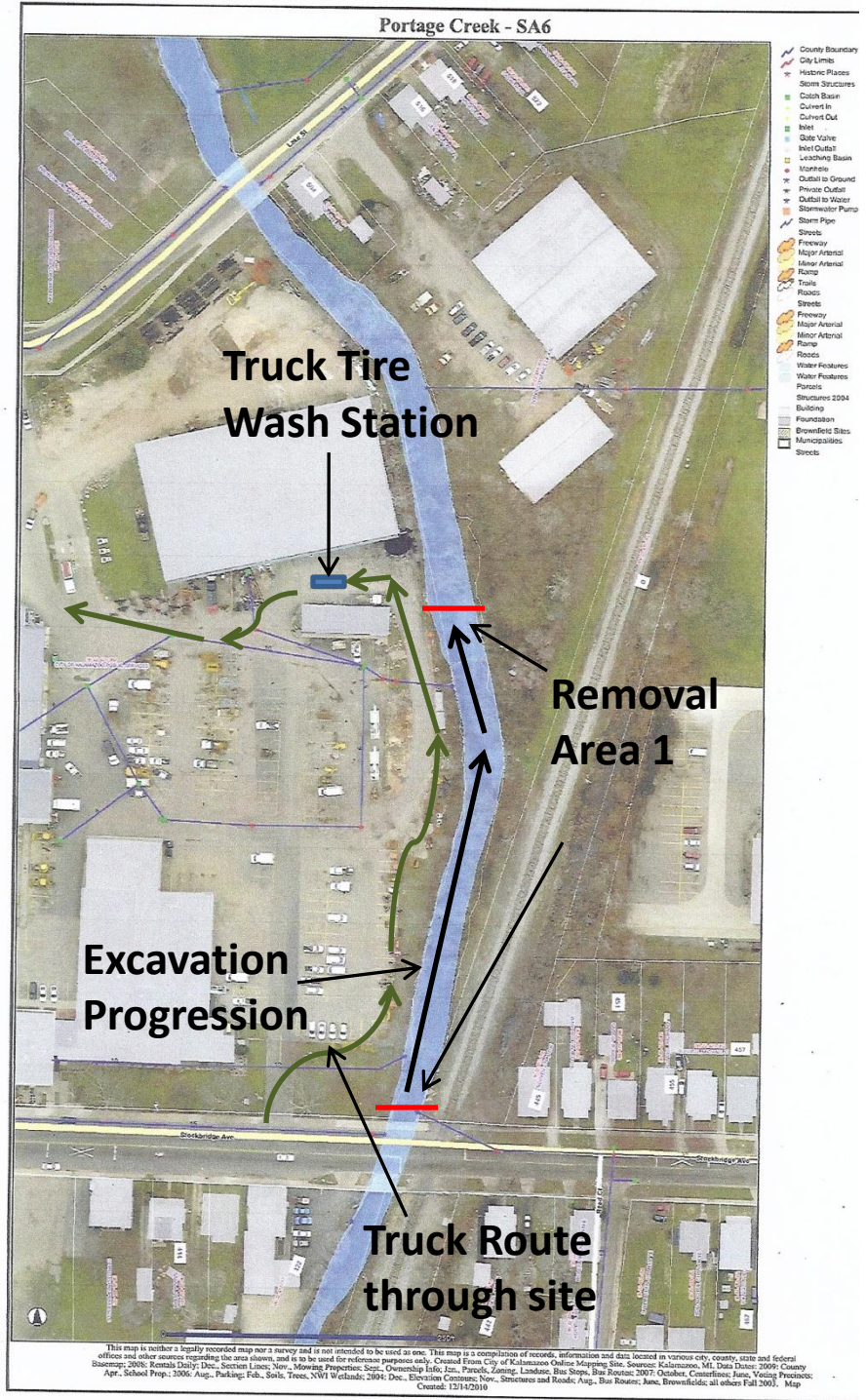
SA 6 Proposed Site Preparation Activities

1. Remove fence line along western bank to facilitate work/*Will need to work through security control options with facility*
2. Clear vegetation along west shoreline to facilitate excavation activities
3. Install Erosion and Sediment/H&S/other Controls/Monitoring
4. Install multiple sheet pile cofferdams to isolate creek removal area sections for dewatering/by pass pumping
5. Extend dewatering pipeline from Main Command Post Support Area to Stockbridge Avenue bridge
6. Set By-pass pumps and dewatering pumps in appropriate locations and begin pumping operations, Pumps will be relocated as appropriate



SA 6 Proposed Removal Area 1
Contaminated Sediment Removal Approach

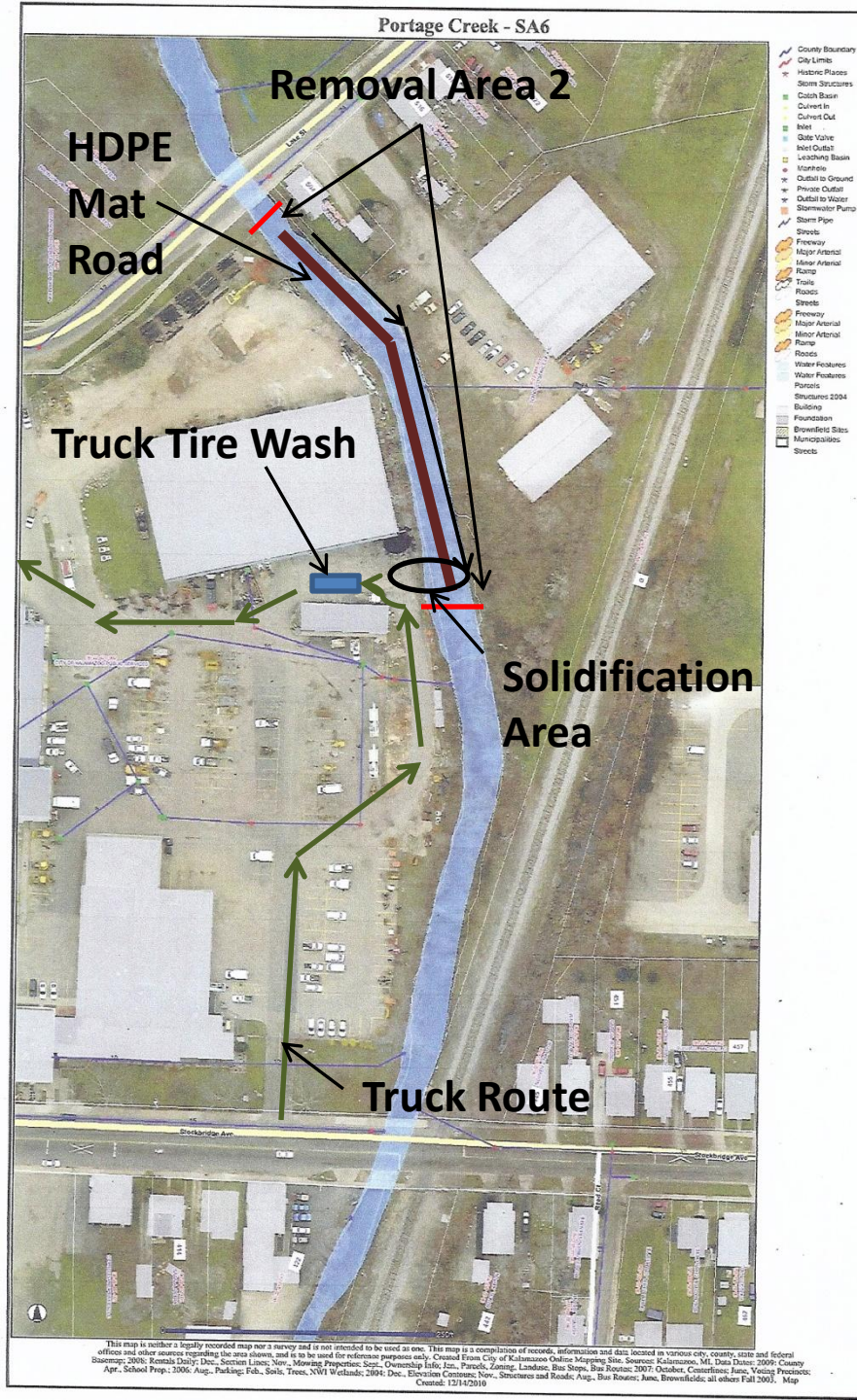
- Addresses Grids SA 6-1 through SA 6-7, approximately 480’ of creek channel
- Long reach excavator will exhume sediment working from upstream (south) to downstream (north) accessing from west creek bank
- Exhumed sediment placed in “stone miser” and mixed with solidification material by second excavator
- Propose transfer dump trucks enter public works yard from Stockbridge Avenue and proceed to creek for loading from excavator/miser box, trucks will proceed to tire wash station after loading and exit through Lake Street gate to take material to staging pad
- Final transport and disposal will be from dewatering/staging pad at EPA support area(location TBD)



SA 6 Proposed Removal Area 2
Contaminated Sediment Removal Approach

- Grids SA 6-8 through SA 6-14, approximately 415’ of creek channel
- HDPE Mat roadway will be extended north from Grid SA 6-8 to Grid SA 6-14 down center of creek channel to serve as work platform for excavation and material transfer
- Excavator will work from north end of roadway and dig south, periodically removing road mats as excavation progresses
- Sediment will be loaded onto crawler carriers to transfer material back to Grid SA 6-8 , where material will be solidified and loaded into transfer trucks to be taken to staging area

Transfer trucks exit through tire wash station



SA 6 Site Controls

Sediment Erosion/Migration Controls

- Silt Fence
- Sediment Curtain
- Turbidity Monitoring
- Discharge pads
- Tire/Equipment Wash
- Solidification
- Dust Control/Water Truck
- House Keeping/power Broom

Site/ Security Controls

- Security Guard as necessary
- Temporary Fencing
- Signage

Health & Safety

- High Visibility Vests
- Use of Manlift to surgically remove trees near power lines
- Use of “super sacks and/or silo” for handling solidification material to minimize dust emissions
- Air Monitoring

Incorporation of appropriate stakeholder input

SA 6 Site Restoration

- Backfill creek to original or agreed to grade with river sand/gravel mix
- Stabilize toe of bank(s)
- Restoration planting with native species-ground cover/shrubs/trees
- Maintain erosion and sediment controls as plants are re-established
- Remove site equipment and facilities
- Repair/replacing fencing
- Repair damage from site operations

Schedule

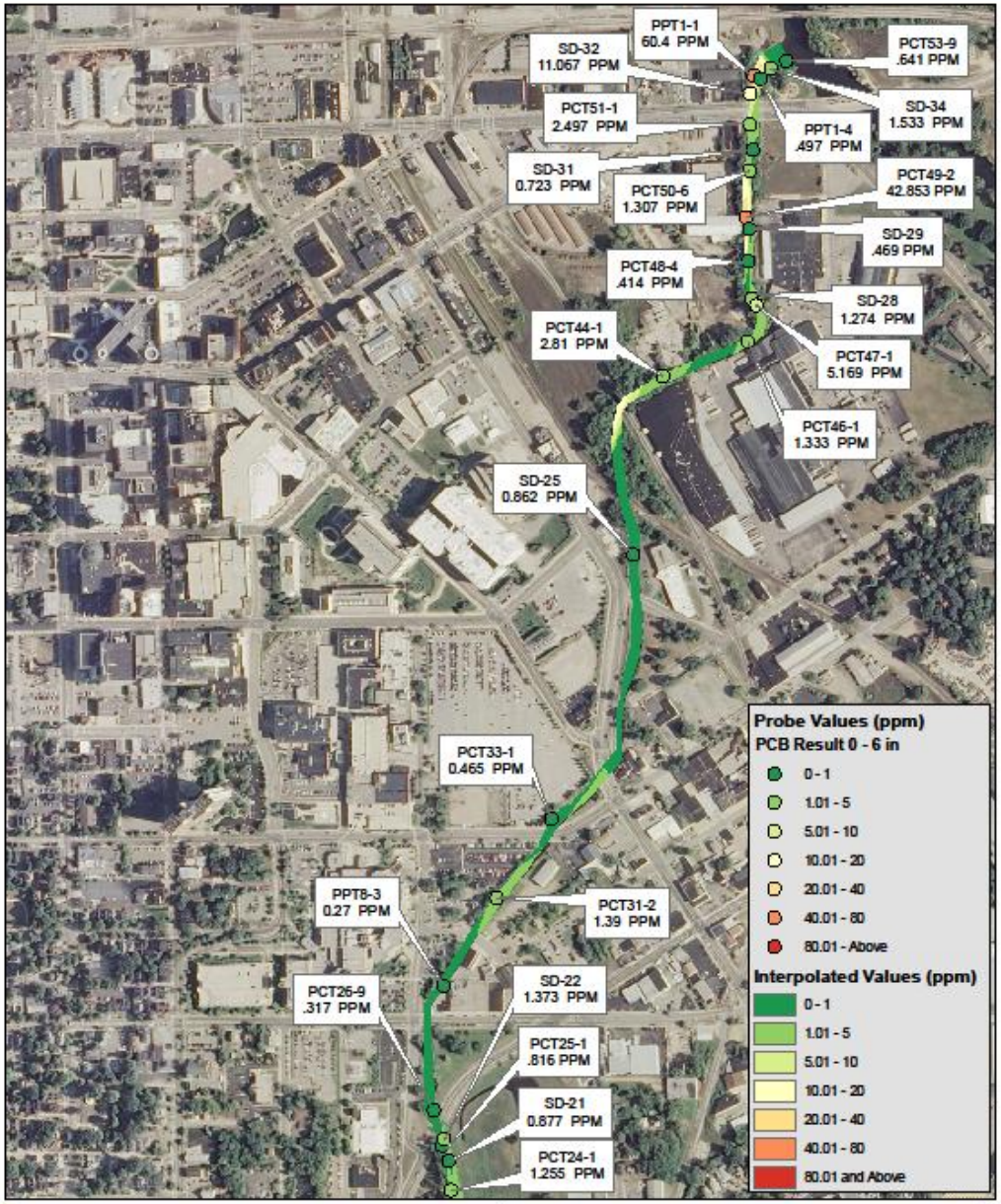
- Currently developing planning documents such as Workplans, Quality Assurance Plans, Sampling Plans, Health and Safety Plans etc.
- Gathering design information to complete plans such as sediment samples, survey data, etc.
- Depending on access agreements we plan to mobilize late August early September
- Project to be completed in phases over a 2 – 4 year period

Kalamazoo River: Portage Creek North

PCB Results for 0 - 6 Inch Interval

Kalamazoo, MI

June 2010



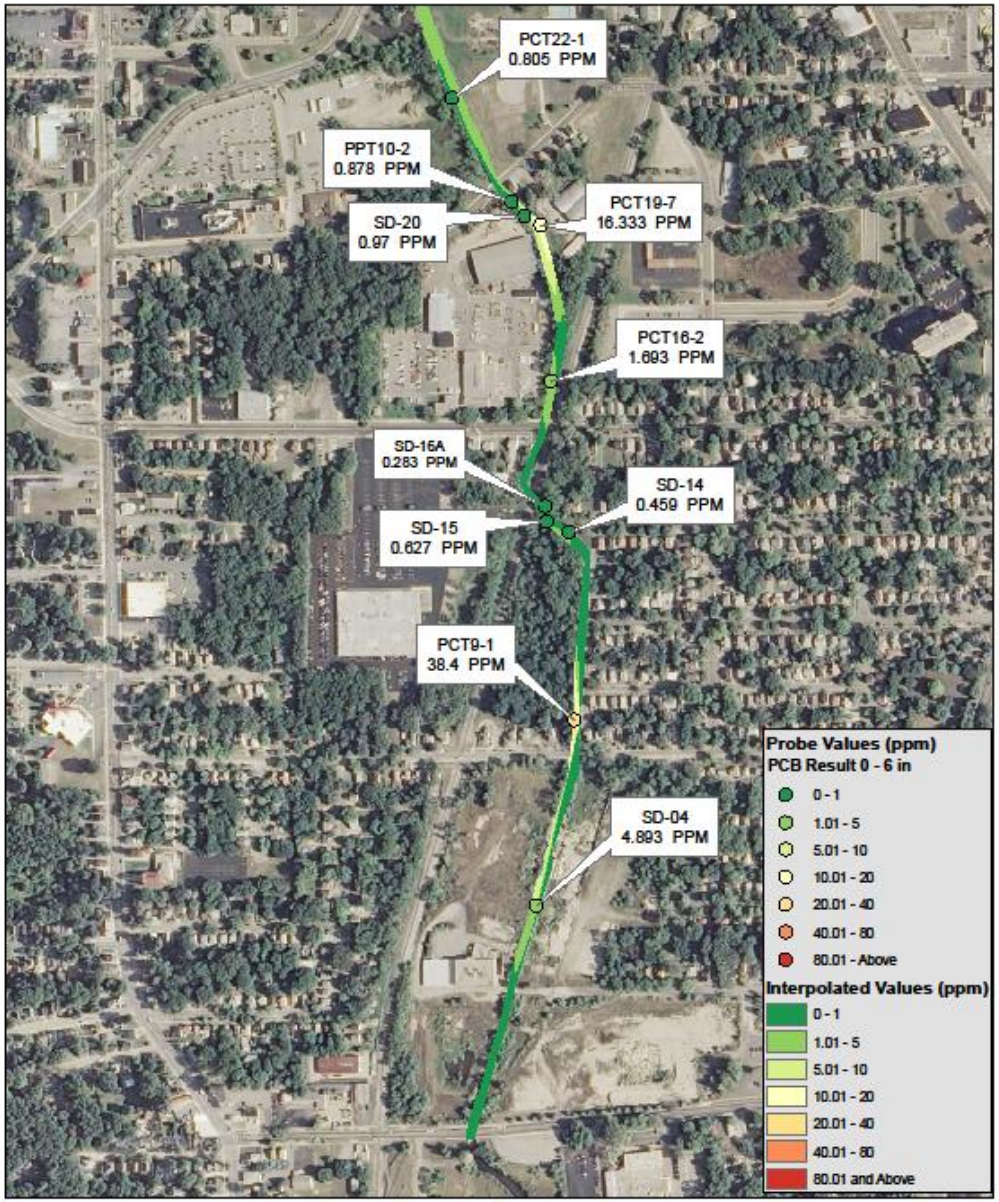
FIELDS

0 170 Meters

UTM Zone 16N, NAD 83
Data Source: USDA / USEPA / ARCADIS
RPM: James Saric
Map Author: Mike Mejac

Kalamazoo River: Portage Creek South
PCB Results for 0 - 6 Inch Interval

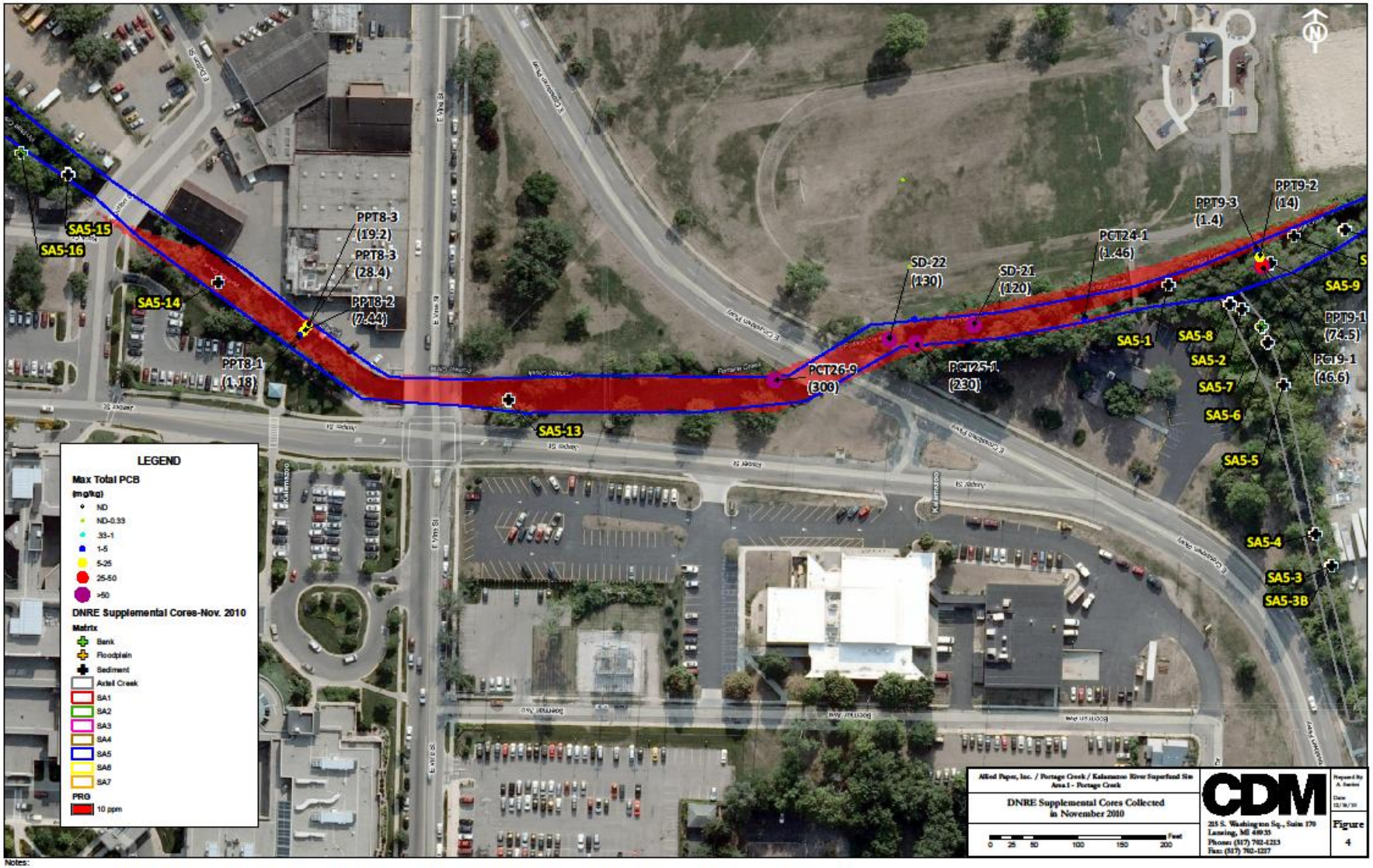
Kalamazoo, MI
June 2010



FIELDS

0 150 Meters

UTM Zone 16N, NAD 83
Data Source: USDA / USEPA / ARCADIS
RPM: James Saric
Map Author: Mike Mejac



Notes:
(1) Image courtesy of (c)2008 NAVTEQ, (c)AND, (c)MapData Sciences Pty Ltd, (c)2007 Zenrin, Image courtesy of NASA, (c)Harris Corp, Earthstar Geographics LLC, Image courtesy of USGS, (c)EarthData, (c)Getmapping plc, (c)2008 GeoEye, (c)2005 Pasco, (c)GeoContent / (p) Intergraph, (c)2007 TerraItaly, (c)2007 Intermap, Image courtesy of the Indiana Map, Image courtesy of the Nevada State Mapping Advisory Committee, (c)2007 InterAtlas, (c)2008 Eurosense, (c)2008 IGP, (c)2008 IGN.
(2) Stream limit developed from aerial photograph taken by Air Land Surveys/CDM - Contract 99034, flown 4/24/1999, scale 1"=1330', pixel resolution = 1 foot, projection = MIS NAD83, vertical datum = NGVD88